THE IRON AGE

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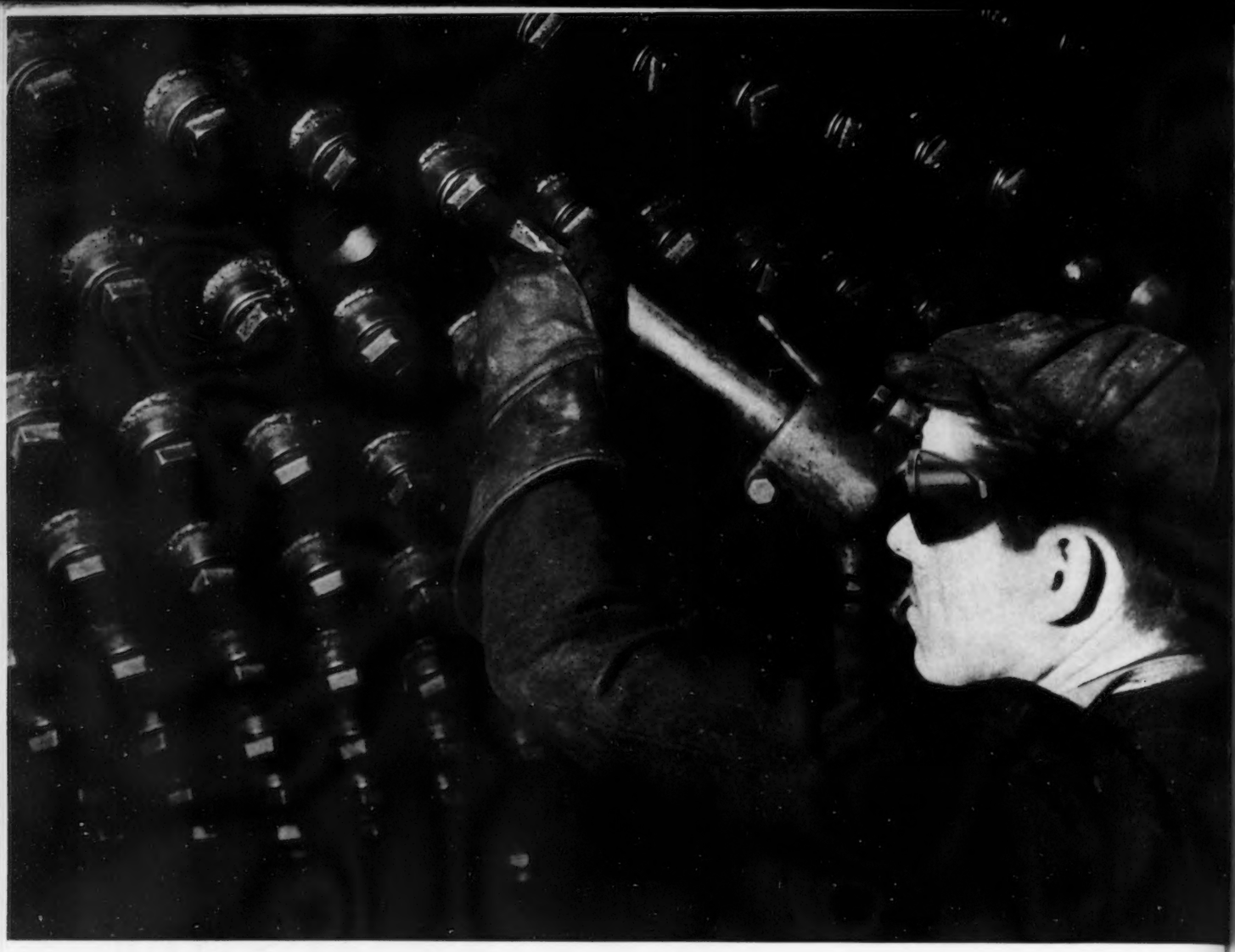

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TOOL STEEL

BETHLEHEM STEEL COMPANY

...THE IRON AGE...

APRIL 8, 1937

ESTABLISHED 1855 Vol. 139, No. 14

When the Consumer Needs a Friend

AMERICAN business has been based upon the principle that it pays to benefit the customer. Our most successful companies have practiced "profit sharing" with consumers of their products. When efficiency gains have been made, reducing costs, part of the saving has gone to those whose purchases keep the business going. Witness the automobile industry as an outstanding example. It has learned that a difference of $10 in the price of a car greatly affects the potential demand.

Economists of all schools unite in the theory that national consuming power is the thing we need to cultivate. Every one admits this during a depression, but when the tide turns and a seller's market appears, we are likely to forget all about it.

It is then that the consumer needs a friend.

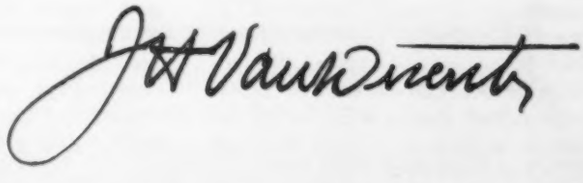
The Government is not doing much for him unless he is incapable of making a living. If he earns wages or a salary, the Government regards him as a meal ticket principally for the support of Government employees and the unemployed.

The present seizing of plants for ransom, which is the popular indoor sport of today, is not doing the consumer any good. The hundreds of millions of dollars of ransom money exacted in higher wages come out of consumers' pockets. The burden is passed along until it reaches the fellow at the end of the line. It has to be so, otherwise makers of products would go out of business.

There may be no limit to what the consumer will stand, but there is a decided limit to what he can spend, especially when the cost of things is increasing faster than his income. That is when the consumer needs a friend.

Is the consumer friendless today? No, indeed! He has plenty of friends. If you are a wise manufacturer, you will give these friends of his a job in your factory where they can work for you and for the consumer jointly.

Modernized machines are the constant friend of the consumer. They make profits for you to share with him.



Solving the Skilled Labor Problem

A middlewestern plant, which manufactures light precision equipment, has solved its skilled labor supply problem in a manner which is so simple and so effective that it will bear observance by others whose problems have been and are of like character. The plan is so direct that it involves neither contract, written agreement, nor a declared set of rules. It is distinctly a merit system which has built morale to the highest point in the history of this old but modern concern.

Previous to 1933 this company sought the open labor market when in need of skilled help and depended almost entirely upon tradesmen trained in other shops. Labor turnover was in line with that of other shops in the area and the supply of men was large or small; of good, fair, or indifferent quality depending upon general labor market conditions. At that time, the management believed that gun and locksmiths trained abroad were necessary for many operations. It was astonished to find that American young men, educated through high school, can be trained to obtain skilled results equal in all respects to those previously achieved by the imported craftsmen. Further, these American boys display self-interest to a degree which is seldom found in the skilled hands of either the American or foreign labor markets.

In 1933, the superintendent of this plant detected the first signs of a better business picture and reasoned that a skilled labor shortage was in the making. He had a labor department but he felt it was too occupied with routine to take on a new project. Also, his ideas of apprentice training for craftsmen had not then been fully crystallized nor completely sold to all department heads. To put this plan in unsympathetic or uninterested hands would have meant either failure or at best mediocre results.

The first impulse was to write a contract, a course of instruction and a good set of rules so that every one concerned would be properly tied to an agreement and would know exactly what to expect during the training period.

However, when the superintendent started to put the plan into effect, he found that simplicity became the watchword and all paper work except essential records was discarded. This put the important angle on the plan that it was to be one in which the boy was to be wholly on his own, to be treated as a young man who came into the shop knowing something in advance, and that he could progress in accordance with his own ability and ambition.

There was and is no impulsive thought that high school boys can be rushed through to craftsmen's standing and pay as a quick stop gap for labor shortage. The foreman, responsible for quality, quantity and wastage in his department, will protect himself by not moving boys under him until they have attained the necessary experience and skill. He is merely acting in self preservation.

Boy Gets a "Break"

By the same token, it is no longer possible for a boy to spend eight or 10 years at the same job and at low pay. Whether or not the boy asks for a raise his case will be considered. If he is found worthy his pay is automatically raised. If no such recommendation can be made for him after a reasonable length of time, which may be anywhere from two to six months, he is dropped because there is a boy to be found who can fill his shoes and who has the spark that will carry him upward.

So by mid-1933, when the company's business was rapidly expanding, applicants were sought from among technical high schools and young men who had made a

start in college but could not afford to carry on. From that time to the present the superintendent has personally interviewed between 300 and 400 boys. Most of them came recommended by people already working for the company or by their friends. This alone tended to form a first tie to the new job. The initial experience with these boys was the focal point about which has crystallized a definite program which has been successful from the start.

At the interviews no promises are made, no signatures are requested. They are honest efforts to determine how much the boy is actually interested, how ambitious he is and what are his aims in life. The fact of the matter is he is not treated as a boy but as a young man.

labor and too freely took advantage of the plight of the young man seeking employment.

Treated Like Men

If the interview with the superintendent is satisfactory the boy is put through the routine of being hired just as any skilled hand would be and he is then sent to the foreman of a department where he can make his best start. He is treated from the first like a man. He is not pampered. He is encouraged to discuss his problems and ambitions with his foreman. He is given important work to do from the start and he knows that in four years or less he can be a full fledged craftsman and that full responsibility for his progress rests on his own shoulders. This last point is stressed at the first interview and the boy is told that the subject will not again be brought up. He will not be lectured nor will persuasion be used to spur his interest should it lag.

He has a probation period in which to make good and if he passes that he knows further advancement must be earned and that it will come as quickly as he earns it. After the first 60 day probationary period he becomes eligible thereafter to participate in premium opportunities at the discretion of his department head. Since 1933 there have been only 10 requests for more pay and in that time the company has voluntarily (on merit) given 1500 raises. The first raise should come during the probationary period and if the boy is making good he can expect raises to follow at periods not to exceed six months. This matter of rates of pay and raises is looked upon by the management as one of mutual benefit whereby both the company and the boy benefit. Another point is that a raise means that the boy moves on to more important work.

It is interesting to note what has happened in the course of 3½ yr. to those boys who were given employment as trade apprentices. Out of the 235 hired, 74 could not make the grade and were dropped, four quit for better positions, 25 have in 3½ yr. completed training and are established as full fledged craftsmen at full pay. Six of the boys developed flairs in other directions and they have been transferred to other kinds of work. There remain 126 boys still in training. About 60 of the 126 were hired in 1936 and are not yet assigned.

The thought arises that appren-

EMPLOYEES SERVICE RECORD

NAME _____ CLOCK NO. _____

DATE EMPLOYED _____ DEPT. _____

EMPLOYED AS _____

DATE	NO.	EXPERIENCE Jan.	Feb.	Mar.	Apr.			July	Aug.	Sept.	Oct.	Nov.	Dec.	RATING A	B	C
1930																
1931																
1932																
1933																
1934																
1935																
1936																
1937																
1938																

Form 74

FIG. 1—This card, kept in the general superintendent's office, shows at a glance the training each apprentice has had.

Several interesting side lights are that only 37 per cent of the applicants interviewed voluntarily stated what rate of pay they wanted at the start and not one among this number asked for a rate as high as the 36c. an hour at which the company starts 18-yr. old boys. If a boy is 20 he starts at 40c. Five per cent wanted more than the starting wage, while 58 per cent of the boys would not so much as venture a guess at the figures at which they wanted to start. These interviews disclosed such a low state of expectations that they form an indictment of industry which too frequently during depression days literally abused

EMPLOYEES PERFORMANCE CARD
MACHINE CO.

For the month of _____ 19____

Check No. _____ Name _____ Dept. _____

Work performed _____

Workmanship { Excellent / Average / Poor } Production { Fast / Medium / Slow }

Character { Careful / Inattentive / Careless } { Capable / Tolerable / Incapable } { Contented / Discontented / Disturber }

General Remarks _____

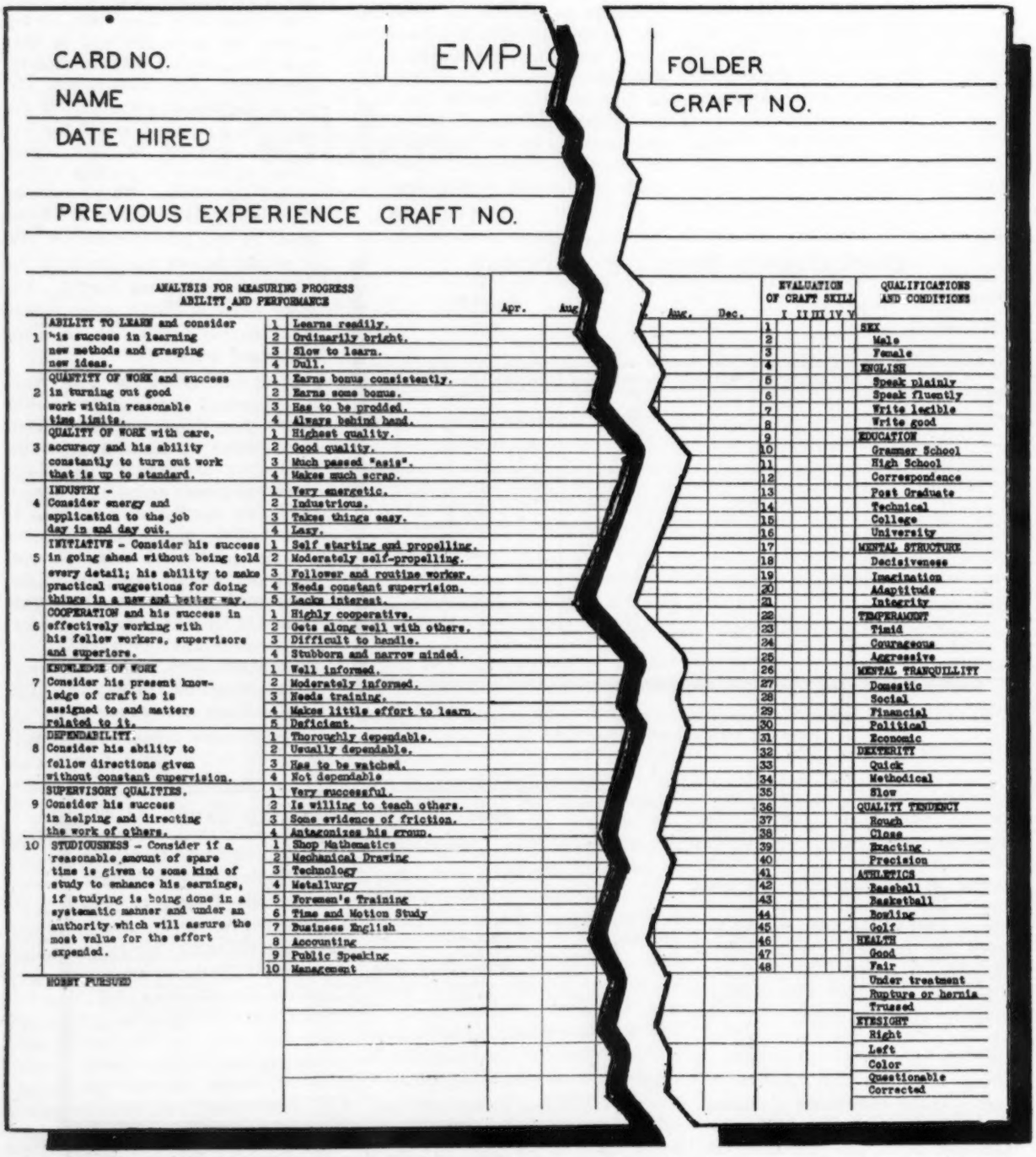
Supervisor _____ Foreman _____

Form 22 Printed in U.S.A.

FIG. 2—All employees in the shop, including apprentices, are reported on this form by the foremen. The work performed, data and rating are posted on the card shown in Fig. 1.

tice training and advancement cannot be expanded too far, otherwise a given company will one day find a saturation point beyond which it cannot continue advancement. The plant in question has not reached such a point which now seems to be farther away than anticipated when the plan was started. The exceptional boy will and does find his own level away from the company which trained him if that company finds itself unable to provide proper opportunities.

This brings up the point of the quality and ambition of the boys undergoing this training. It occurred to someone to determine what advantage the boys were taking of night courses offered by nearby public schools and private institutions and it was found that 95 per cent of the boys were voluntarily taking courses of study. Several boys were carrying three courses each which prompted the management to pass down a word of caution, suggesting that health must be safeguarded and that time should be taken for recreation. What do the boys choose to study? They run through the study list of law, English, management, accounting, psychology, economics, chemistry, mathematics, mechanics, etc., apparently not stopping until they reach home economics and interior decorating.



CARD NO. | EMPL | FOLDER

NAME | CRAFT NO.

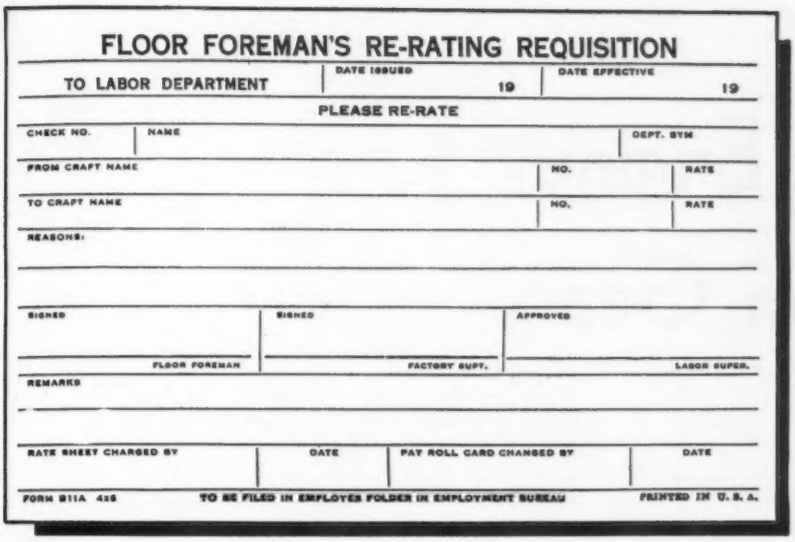
DATE HIRED

PREVIOUS EXPERIENCE CRAFT NO.

	ANALYSIS FOR MEASURING PROGRESS ABILITY AND PERFORMANCE		Apr.	Aug.	Aug.	Dec.	EVALUATION OF CRAFT SKILL I II III IV V
1	ABILITY TO LEARN and consider his success in learning new methods and grasping new ideas.	1 Learns readily. 2 Ordinarily bright. 3 Slow to learn. 4 Dull.					
2	QUANTITY OF WORK and success in turning out good work within reasonable time limits.	1 Earns bonus consistently. 2 Earns some bonus. 3 Has to be prodded. 4 Always behind hand.					
3	QUALITY OF WORK with care, accuracy and his ability constantly to turn out work that is up to standard.	1 Highest quality. 2 Good quality. 3 Much passed "asis". 4 Makes much scrap.					
4	INDUSTRY - Consider energy and application to the job day in and day out.	1 Very energetic. 2 Industrious. 3 Takes things easy. 4 Lazy.					
5	INITIATIVE - Consider his success in going ahead without being told every detail; his ability to make practical suggestions for doing things in a new and better way.	1 Self starting and propelling. 2 Moderately self-propelling. 3 Follower and routine worker. 4 Needs constant supervision. 5 Lacks interest.					
6	COOPERATION and his success in effectively working with his fellow workers, supervisors and superiors.	1 Highly cooperative. 2 Gets along well with others. 3 Difficult to handle. 4 Stubborn and narrow minded.					
7	KNOWLEDGE OF WORK Consider his present knowledge of craft he is assigned to and matters related to it.	1 Well informed. 2 Moderately informed. 3 Needs training. 4 Makes little effort to learn. 5 Deficient.					
8	DEPENDABILITY. Consider his ability to follow directions given without constant supervision.	1 Thoroughly dependable. 2 Usually dependable. 3 Has to be watched. 4 Not dependable					
9	SUPERVISORY QUALITIES. Consider his success in helping and directing the work of others.	1 Very successful. 2 Is willing to teach others. 3 Some evidence of friction. 4 Antagonizes his group.					
10	STUDIOUSNESS - Consider if a reasonable amount of spare time is given to some kind of study to enhance his earnings, if studying is being done in a systematic manner and under an authority which will assure the most value for the effort expended.	1 Shop Mathematics 2 Mechanical Drawing 3 Technology 4 Metallurgy 5 Foremen's Training 6 Time and Motion Study 7 Business English 8 Accounting 9 Public Speaking 10 Management					
	HOBBY PURSUED						

QUALIFICATIONS AND CONDITIONS	
1	SEX
2	Male
3	Female
4	ENGLISH
5	Speak plainly
6	Speak fluently
7	Write lecible
8	Write good
9	EDUCATION
10	Grammar School
11	High School
12	Correspondence
13	Post Graduate
14	Technical
15	College
16	University
17	MENTAL STRUCTURE
18	Decisiveness
19	Imagination
20	Adaptitude
21	Integrity
22	TEMPERAMENT
23	Timid
24	Courageous
25	Aggressive
26	MENTAL TRANQUILLITY
27	Domestic
28	Social
29	Financial
30	Political
31	Economic
32	DEXTERITY
33	Quick
34	Methodical
35	Slow
36	QUALITY TENDENCY
37	Rough
38	Close
39	Exacting
40	Precision
41	ATHLETICS
42	Baseball
43	Basketball
44	Bowling
45	Golf
46	HEALTH
47	Good
48	Fair
	Under treatment
	Rupture or hernia
	Trussed
	EYESIGHT
	Right
	Left
	Color
	Questionable
	Corrected

FIG. 3—These record cards are kept by the labor department for all men employed by the company. Note how this card fits the purpose of apprentice records.



FLOOR FOREMAN'S RE-RATING REQUISITION

TO LABOR DEPARTMENT | DATE ISSUED 19 | DATE EFFECTIVE 19

PLEASE RE-RATE

CHECK NO. | NAME | DEPT. SYM

FROM CRAFT NAME | NO. | RATE

TO CRAFT NAME | NO. | RATE

REASONS:

SIGNED (FLOOR FOREMAN) | SIGNED (FACTORY SUPT.) | APPROVED (LABOR SUPER.)

REMARKS

RATE SHEET CHANGED BY | DATE | PAY ROLL CARD CHANGED BY | DATE

FORM 811A 4x6 | TO BE FILED IN EMPLOYEE FOLDER IN EMPLOYMENT BUREAU | PRINTED IN U. S. A.

FIG. 4—When a foreman decides that an apprentice is worthy of a pay rise he may requisition it.

The fact of the matter is that the mental caliber of these boys, both apprentices and craftsmen, is well above that of the average skilled hand taken in the open market. They readily work from blue prints and wastage is far less than that usually produced by the ordinary itinerant worker.

Records made and kept are simple but effective in keeping track of progress made by the boys and as a means of matching them against the work schedule. Fig. 1 shows the employees' service card, copies of which are filed in the superintendent's office. At a moment's notice reference to these cards will show the departments in which a boy has worked and he therefore can quickly be placed to balance labor against the work load. Not only apprentice boys but all employees are reported by foremen on the cards shown by Fig. 2. This report is made each month. It shows the trend of the character of the man and his work. These cards are effectively used to prevent oversight whereby a man might be overlooked or forgotten and permitted to stagnate on a menial job, or one below his capabilities, or potentialities.

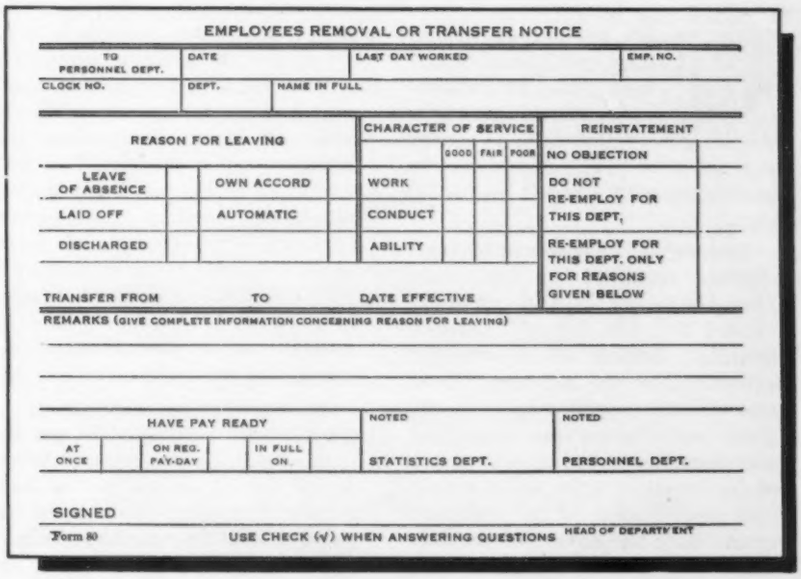
The employees' service record shown in Fig. 3 is kept by the labor department and it is maintained from the time a boy starts until he leaves the company. Ten major characteristics are recorded, plus numerous qualifications, as well as tardiness and absence from work. Craft skill is also evaluated. This card shows at a glance what a boy is accomplishing and by this record is determined whether or not a boy is entitled to an increase of pay.

Requisitioning a "Raise"

When a foreman comes to the conclusion that a boy is entitled to a rise he may requisition it as shown in Fig. 4. This form is made in duplicate by the foreman and it must have the approval of the factory manager. The original copy goes to the labor department and then to the accounting division. The duplicate goes back to the foreman showing him that a decision has been reached in the matter. Transfers and dismissals are reported on the forms shown in Fig. 5.

Periodic written reports as made by foremen are not the only means of following progress made by the boys. At informal gatherings, held at times only a week apart, boys' records are scanned for the purpose of realigning their duties and work as a step in properly distributing labor according to the work schedule. A capable boy may be moved upward following any one of these meetings.

On first impulse it might be argued that without contract and written rules this craftsman apprentice plan is loosely held together, and that morale and ambition can easily start to lag. However, it must be remembered that these boys are selected because they are interested in themselves. They want to work and they are ambitious to gain advancement which comes not as a cut and dried matter at stated intervals but at the time it is deserved. The boy has no notion of a perfunctory wait of six months because he knows a raise will come in less than that period if he and his work deserve it. Unhampered by rules other than those which apply to all workmen in the shop, put on important work from the start, and encouraged to bring up his problems as a man and not as a boy in school, result in fast development and a supply of craftsmen which is outstanding in ability, morale and loyalty.



EMPLOYEES REMOVAL OR TRANSFER NOTICE

TO PERSONNEL DEPT. | DATE | LAST DAY WORKED | EMP. NO.

CLOCK NO. | DEPT. | NAME IN FULL

REASON FOR LEAVING: LEAVE OF ABSENCE | OWN ACCORD | LAID OFF | AUTOMATIC | DISCHARGED

CHARACTER OF SERVICE: | GOOD | FAIR | POOR | WORK | CONDUCT | ABILITY

REINSTATEMENT: NO OBJECTION | DO NOT RE-EMPLOY FOR THIS DEPT. | RE-EMPLOY FOR THIS DEPT. ONLY FOR REASONS GIVEN BELOW

TRANSFER FROM TO DATE EFFECTIVE

REMARKS (GIVE COMPLETE INFORMATION CONCERNING REASON FOR LEAVING)

HAVE PAY READY: AT ONCE | ON REG. PAY-DAY | IN FULL ON

NOTED: STATISTICS DEPT. | NOTED: PERSONNEL DEPT.

SIGNED

Form 80 | USE CHECK (√) WHEN ANSWERING QUESTIONS | HEAD OF DEPARTMENT

FIG. 5—This record gives reasons and data regarding dismissal or transfer.

Aircraft Engine Reduction Gears

By FORD L. PRESCOTT

Senior Mechanical Engineer (Research) Power Plant Branch, Materiel Division, United States Air Corps

IN discussing an important application of gearing, this article will be of interest to manufacurers of gears and of gear making equipment as well as to designers in the aircraft industry. It is from a paper presented by Mr. Prescott at the National Aeronautic Meeting of the Society of Automotive Engineers, held at Washington, March 11 and 12.

IN the present era of high performance and high power aircraft engines the subject of reduction gearing has come to occupy a position of prime importance in connection with aircraft engine design.

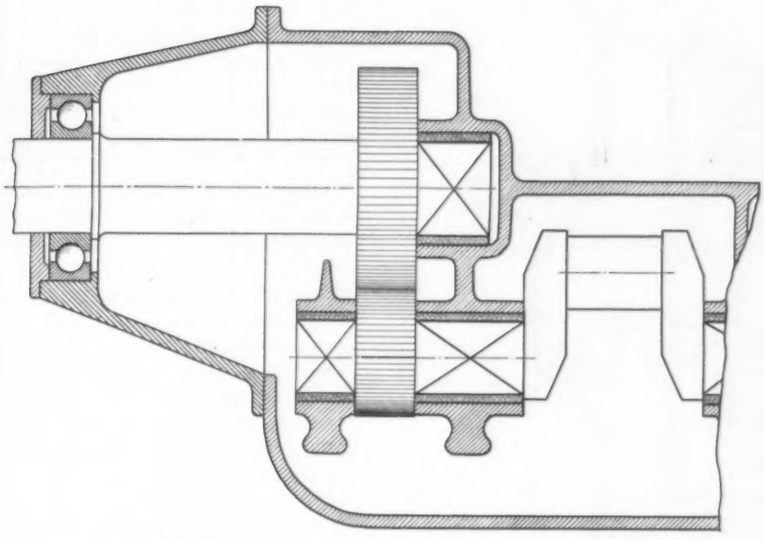
As long as the power of aircraft engines remained in the range from 100 to 450 hp., little necessity existed for the use of reduction gearing. Engine speeds were not excessive and the necessary diameter of the propeller to give efficient performance was not great and therefore little necessity existed for introducing the added weight and complication of a reduction gear. With the advent of the Liberty engine and others which were developed at approximately the same time giving horsepowers in excess of 450, the desirability of introducing some form of reduction gear became apparent.

Propeller designers tell us that the resultant tip velocity of a propeller should not exceed 900 ft. per sec. if efficient performance is to be derived from the propeller. An example of the effect of tip speed on efficiency is found in a certain military airplane incorporating a direct drive engine of 600 hp. with a normal crankshaft speed of 2400 r.p.m. The pitch of the propeller was increased without a corresponding compensation for pitch distribution error so that the speed of the engine was reduced to 2100 r.p.m., and the writer's recollection is that the speed of the airplane was increased approximately 10 miles per hour. It appears that much energy is dissipated in useless work on the air when the resultant tip speed of the propeller approaches the velocity of sound in air. Under these conditions a great amount of energy is radiated as noise and, of course, does no good so far as propulsion is concerned.

Another factor contributing to the necessity for reduction gearing is the desire to increase the horsepower output of engines without greatly increasing the size of the power plant. This can be economically accomplished by operating engines at a higher crankshaft speed than would be efficient for propeller operation. In this case however some 60 to 120 lb. of weight must be added in the form of reduction gearing and also a considerable amount of weight is added in the propeller in order to withstand the increased torque and thrust loads on the propeller blade shanks and hub. As is usual, therefore, the matter of choosing the reduction gear ratio becomes a matter of compromise in the design between a condition of low power plant weight and low propulsive efficiency and increased power plant weight with higher propulsive efficiency. With present day engine designs the crankshaft speed far exceeds the economical propeller speed. However if the reduction gear ratio and propeller diameter are increased to the optimum value from the standpoint of propulsive efficiency, the weight in some cases is prohibitive.

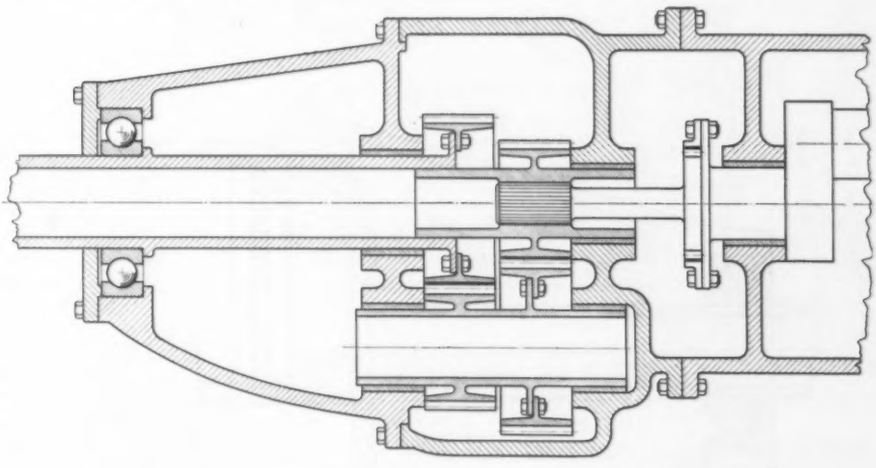
In general, the types of reduction gearing which have been successfully used fall into approximately seven groups, each one having particular advantages and disadvantages and each capable of a more or less limited range of reduction gear ratios.

Fig. 1 shows, in diagram, a reduction gear of the single reduction spur gear type. This is probably one of the simplest as well as one of the oldest. It employs only two spur gears and is capable of providing a considerable range of



ABOVE

FIG. 1—Single Reduction Spur Gear Type



AT RIGHT

FIG. 2—Double Reduction Spur Gear Type

reduction gear ratios. For engines of 1000 to 1500 hp. this type of reduction gear may become quite cumbersome especially in view of the fact that ratios from 2-2.5 to 1 will be required. This would necessitate a propeller shaft gear of considerable size and therefore may result in a higher weight than could be obtained with other forms of reduction gearing. In this gear the propeller rotates in a direction opposite to that of the crankshaft. The effect of this on crankcase stresses will be mentioned in a later discussion.

Double Reduction Spur Gear Type

In Fig. 2 is shown a double reduction spur gear type in which a jackshaft is utilized in some such manner as the back-gearing on a lathe. In this type no difficulty exists in getting all of the range in gear ratios which may be desired. It has the advantage of compactness, can be made quite light in weight and is adapted for quite large horsepowers. In this type of gearing the propeller rotates in the same direction as the crankshaft.

A variation of this design would consist in utilizing two or more jackshafts, thus distributing the tooth loads over more teeth with a resultant saving in gear face width and a probable saving in weight. This gear has the advantage of being concentric with the crankshaft and would be ideal for an engine of the V-type, either upright or inverted, in which the jackshaft centerline is placed in the "V" of the engine.

Fig. 3 shows the Farman type of bevel reduction gear. In practice the crankshaft gear and the stationary gear are universally mounted to equalize the tooth load between the spider pinions, which usually are three in number. This gear is capable of a range of ratios from about 1.5 to 1 to 2.5 to 1, a ratio of 2 to 1 being obtained with the spider arms perpendicular to the crankshaft centerline. It also provides a propeller shaft centerline concentric with the crankshaft and is therefore adapted to both in-line and radial type of engines. It calls for precision in manufacture and it is believed that some difficulty exists in the matter of grinding bevel gear teeth. Otherwise it appears that this type of gear is deserving of the consideration it has received from aircraft

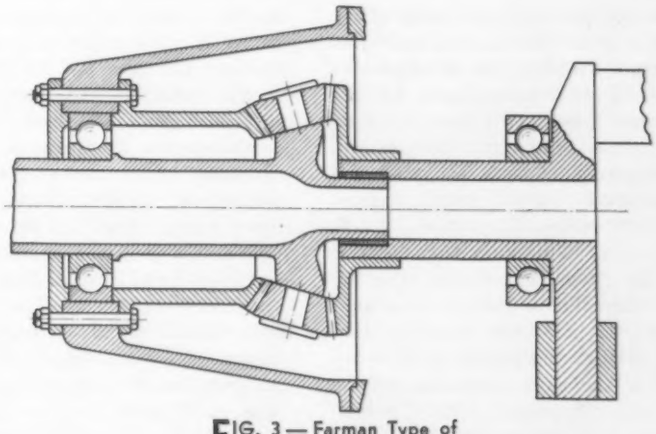


FIG. 3—Farman Type of Bevel Gear Reduction

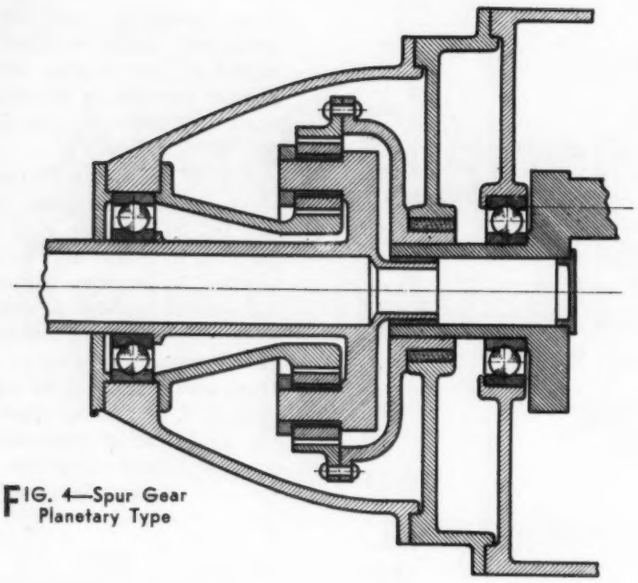


FIG. 4—Spur Gear Planetary Type

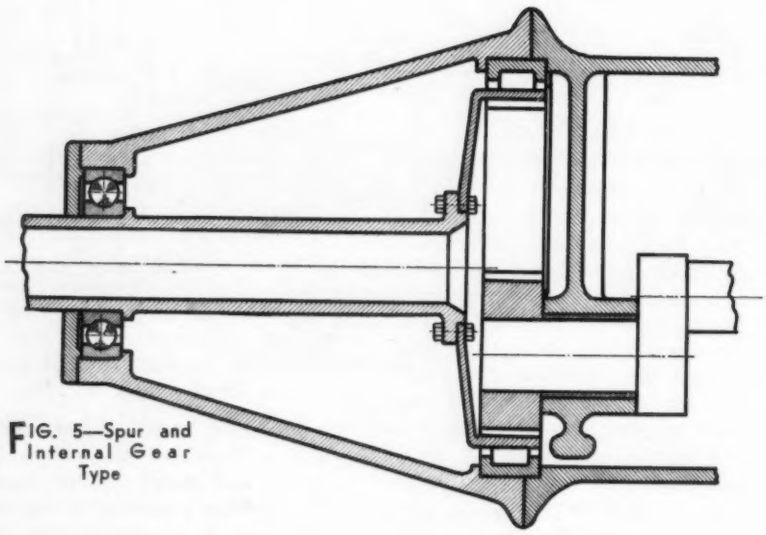


FIG. 5—Spur and Internal Gear Type

engine designers. The direction of rotation of the propeller shaft is the same as that of the engine.

Spur Gear Planetary Type

In Fig. 4 is shown a type of reduction gear that utilizes spur and internal gearing and incorporates some of the advantages of the Farman type. This gear is at its best at a reduction ratio of approximately 1.5 to 1. It is limited structurally to a rather narrow band of ratios from about 1 1/3-1 2/3 to 1. This gear is concentric and the propeller rotation is in the same direction as that of the crankshaft. It possesses a unique feature in that the planet pinions rotate in the same direction as the spider. Therefore, the friction torque of the planet pinion is added to the propeller torque, thus giving a reduction gear of exceptionally good efficiency.

A variation of this type of reduction gear consists in mounting the central pinion on the engine shaft, in which case either the spider or the internal gear is held stationary in the reduction gear case. If the internal gear is stationary the spider drives the propeller in the direction of rotation of the central pinion. If the spider is stationary, the internal gear drives the propeller in a direction opposite to the rotation of the central gear. These variations of this type are limited to a narrow band of ratios in excess of 2 to 1 by structural details. As many as six planet wheels have been used in this type of gearing in order to reduce the necessary face width to transmit power. A minor disadvantage of this type of gear is high pitch line velocity of the internal gear when driven directly by the engine gear shaft.

Spur and Internal Combination

Fig. 5 shows a type of reduction gear incorporating a spur pinion meshing directly with an internal gear. The extreme simplicity of this gear and the large number of teeth in contact have made this gear a favorite among engine designers, although a basic defect resides in the fact that it is extremely difficult to provide an outboard bearing for the shaft on which the pinion operates. For this reason the utility of this form of gearing has been quite limited.

It is believed that at present there are two engines which have successfully utilized this form of gearing. This has been done by utilizing a very rigid crank cheek and front crankshaft journal in order to reduce to a minimum the deflection of the crankshaft, which causes difficulty by shifting the gear teeth loads to the rear corners of the pinion teeth.

A number of unsuccessful attempts have been made to utilize this form of gear because of the inherent simplicity and attractiveness of the design. The direction of rotation of the propeller shaft is the same as that of the engine but the gear is not quite concentric. The large size of the bearing which carries the internal gear is objectionable although it is believed that this problem has been satisfactorily solved. This gear is capable of ratios from about 1 1/3 to 1 up to 2 or 2.5 to 1, without increasing the physical size beyond practicable limits.

Differential Type Dual Rotation Gear

In Fig. 6 is shown a differential type of dual rotation gear in which the propeller speed is the same as the engine speed, but in which two propellers are driven in opposite directions in order to eliminate propeller torque reaction. It appears that this form of gearing should be practicable for horsepowers up to 800 or 900 since under these conditions only 400 to 450 hp. need be taken from each propeller.

Fig. 7 shows a somewhat more attractive form of dual rotation gear employing an all-spur-gear

train and rotating two propellers in opposite directions. This form of gear is practicable over a range up to approximately 2 to 1 before the propeller-shaft gears attain such size as to run into excess weight. A further variation of this type of gear would consist of including a primary pair of gears such as shown in Fig. 2, in which case any desired reduction gear ratio could be obtained and the gear would be of the concentric type. This type of gear would be well adapted to engines of 1000 to 2000 hp.

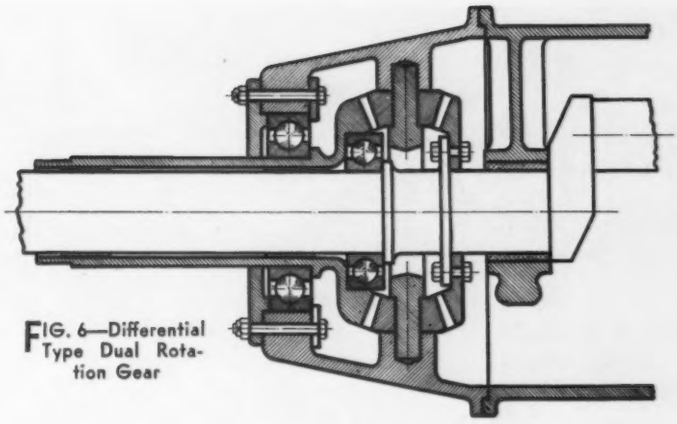


FIG. 6—Differential Type Dual Rotation Gear

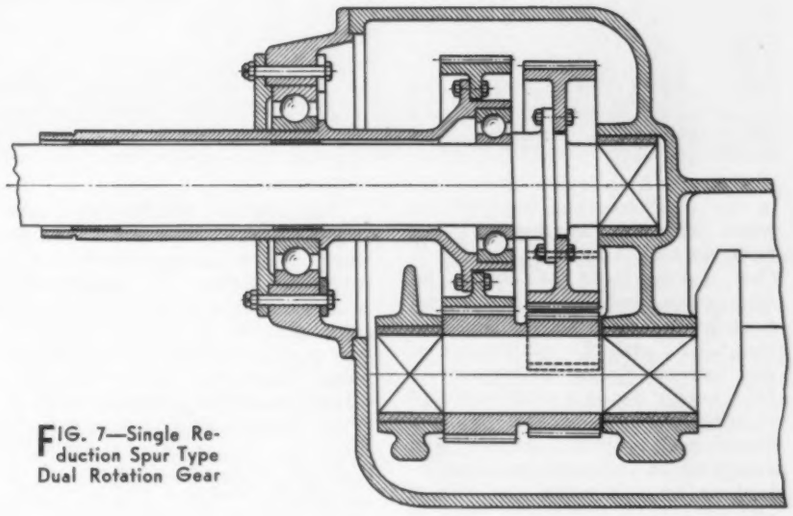


FIG. 7—Single Reduction Spur Type Dual Rotation Gear

Crankcase and Engine Mount Stresses

The various types of reduction gears should be studied from the standpoint of stresses in the crankcases and engine mounts. In any case it may be readily seen that the propeller torque reaction will be transmitted to the engine mounting. In this respect the dual rotation types of reduction gear have a decided advantage in that the resultant torque will probably be near zero under all operating conditions. A possible exception may arise in the provision of one fixed and one controllable pitch propeller. Present indications are, however, that both front and rear propellers will be fully controllable so that in most conditions of operation the torque will be balanced. In the matter of crankcase stresses those reduction gears which turn the propeller in the same direction as the crankshaft give gear case torque stresses considerably lower than those types in which the propeller rotates in the direction opposite to the crankshaft rotation.

Gear Tooth Forms and Load Equalization

The use of stub teeth gearing with its increased tooth strength has largely been discarded in late designs in order to provide increased life as well as reduce the tooth pressure per contact. Utilizing long addendum gears it is possible to increase the number of teeth in contact and to secure a better ground gear life. The development of a means whereby gear tooth profiles can be ground in production has added immeasurably in increasing the life of highly stressed gears.

Where the drive is through a single contact as in the single reduction spur type it has been found advantageous to utilize the herringbone type of gear. This gear provides an especially smooth drive and transmits the load from one tooth to another without shock. This matter is of great importance from the standpoint of the life of highly stressed gearing.

In reduction gearing of the multiple-contact type such as the Farman and spur and internal epicyclic type, efforts have been made to produce equalization of the loads on the various planet pinions employed. Some designs have incorporated a system of linkage intended to equalize the loads among the planet pinions. Other designs have incorporated sufficient flexibility in the spider arms and pinions to secure equalization by permitting deflection of the reduction gear parts. It is, of course, apparent that load equalization is essential to securing the best life of the gearing where two or more contacts are utilized, as in the types mentioned.

Propeller Shaft Speeds

For the present and the near future it appears that engines in the neighborhood of 1000 hp. will be available for those designs where the most economical propeller speed appears to be 1100 to 1500 r.p.m. If in the near future, engines of 1500 to 2000 hp. become available it will be essential to reduce the propeller shaft speed to 800 to 1000 r.p.m. in order to avoid the loss due to operating propellers at tip speeds in excess of 900 ft. per sec. At the same time, considerations of power plant design appear to indicate crankshaft speeds in the neighborhood of 3000 r.p.m. From this consideration it is seen that reduction gear ratios of 3 to 3.5:1 will be essential. This matter greatly simplifies the selection of a reduction gear type in view of the fact that ratios of the order of 3 to 1 are more economically obtained with double reduction types of gearing.

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FIG. 1—Lathe spindles with American Standard spindle noses. The complete series comprises two smaller and two larger noses, seven in all.

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New Spindle Nose and Chuck Standards Provide Better Design

THE new American Standard lathe spindle noses and the new American Standard chucks recently approved by the American Standards Association are shown in the accompanying illustrations, which with the data herewith are from an article by J. E. Lovely in the March issue of *Industrial Standardization and Commercial Standards Monthly*, published by the A.S.A. with the cooperation of the National Bureau of Standards. Mr. Lovely is vice-president and chief engineer, Jones & Lamson Machine Co., Springfield, Vt., and chairman of the technical committees on spindle noses and collets and on chucks and chuck jaws of the Sectional Committee on Small Tools and Machine Tool Elements.

These new standards serve a long-felt need in enabling the user to interchange chucks and fixtures on different types of turret lathes, automatic lathes and engine lathes. In addition, they represent a great advance in design and performance.

The new spindles furnish a more rigid mounting of chucks and fixtures than previous threaded noses, or earlier forms of flanged spindles, and provide a degree of accuracy in alinement and interchangeability previously considered impossible. They overcome the recognized objections of the threaded nose, remove danger of chucks coming loose at high speeds when the spindle brake is applied or the spindle is reversed, and they allow chucks to be changed easily and quickly.

These new American Standards were approved by the turret lathe group and the automatic lathe group of the National Machine Tool Builders' Association about two years ago and are now available on most of the new models of turret lathes and automatic lathes made in this country today. In addition two prominent engine lathe builders are furnishing all of their machines with the new spindle noses and most other engine lathe builders are in position to furnish them.

Fig. 1 shows a group of lathe spindles with 6, 8, and 11-in. type A1 American Standard lathe spindle noses. The complete series comprises two smaller and two larger spindle noses, the largest nose in the series, the 20-in., accommodating holes up to 15 in. in diameter.

A turret lathe equipped with a 6-in. type A1 standard lathe spindle nose is pictured in Fig. 2. The mating American Standard

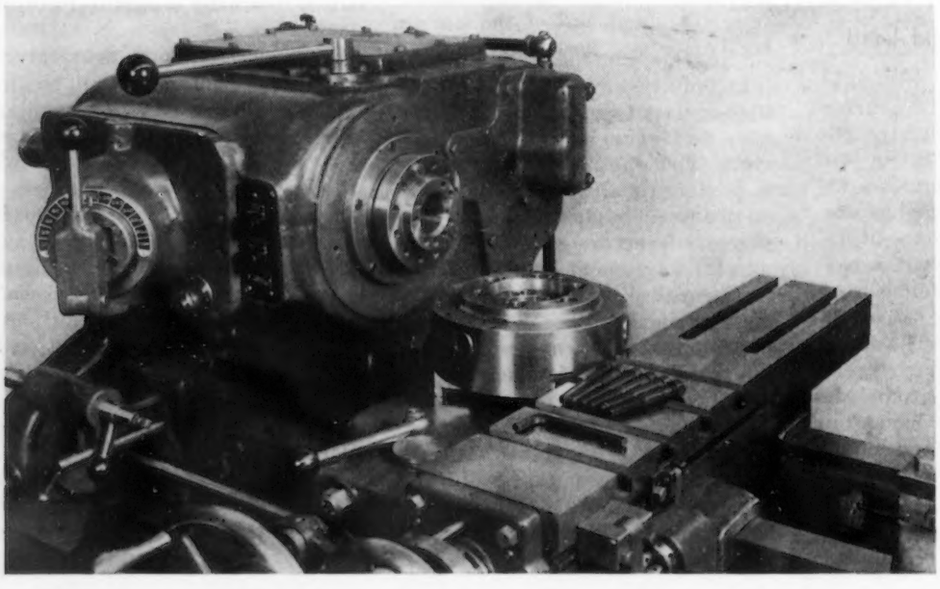

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FIG. 2—Turret lathe equipped with a 6-in. type A1 standard lathe spindle nose. In this case the mating 10-in. American Standard chuck is attached by socket head cap screws passing through the chuck inside the scroll.

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FIG. 3—This turret lathe is equipped with a 6-in. type D1 standard spindle nose. The chuck is held by six cam lock studs which are engaged by cams provided with square sockets in the flange of the spindle nose. This D1 form of nose provides for quick changing of chucks and fixtures.

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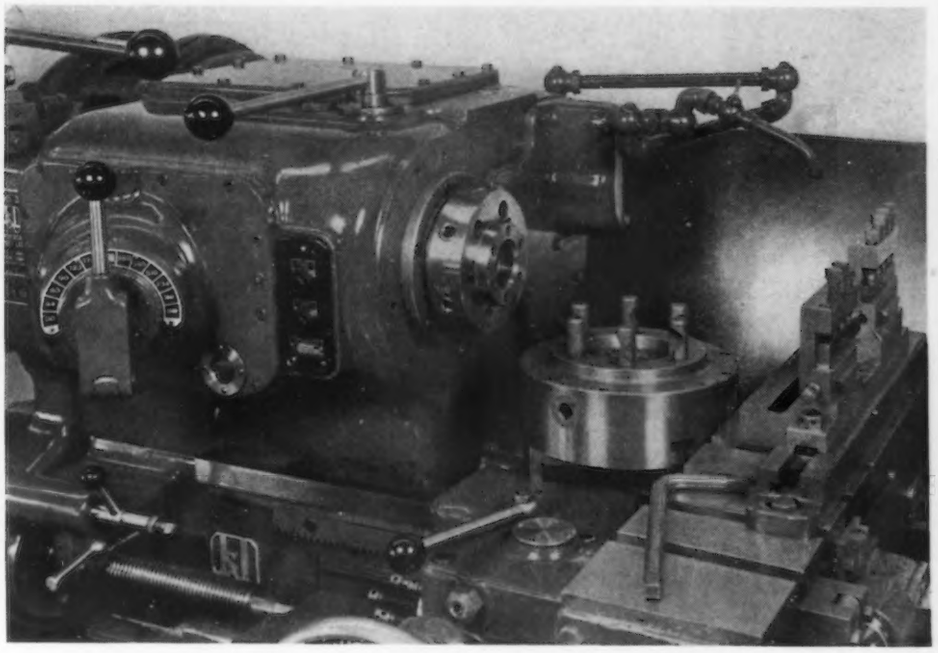

chuck also shown is in this case attached by socket head cap screws passing through the chuck inside the scroll.

Fig. 3 shows another turret lathe equipped with a 6-in. type D1 American Standard lathe spindle nose. The mating 10-in. standard chuck is the same as that in Fig. 2 except that it is held in position on the spindle nose by means of six cam lock studs shown projecting from the back of the chuck, which are engaged by the cams provided with square sockets in the flange of the spindle nose. This D1 form of nose provides means for a quick change of chucks and fixtures. Both the types A1 and D1 spindles have the same diameter taper pilots and the same location of the outer bolt circles, so that chucks and fixtures may be made interchangeable on both types.

All of these spindles are provided with a taper pilot and all fixtures and chucks are made to give a tight fit on the pilot when drawn back against the flat face. This feature allows the spindle to be reconditioned at any time should the pilot become worn or the face mutilated, because the original size on the taper pilot may be obtained by grinding back on the face and regrinding the pilot.

A group of the new American Standard chucks is pictured in Fig. 4. Controlling dimensions of all chucks from 6 to 36 in. in diameter in both medium-duty and heavy-duty types have been established. Both of these types have master jaws of the tongue and groove type and dimensions have been established making the top jaws interchangeable. An extra-heavy series of chucks with serrated master jaws has also been provided. Dimensions have been established for power and hand-operated chucks of the 2, 3 and 4 jaw types, the top jaws being interchangeable on power and hand-operated chucks of the same outside diameter.

The new American Standard chucks may be mounted directly on the American Standard lathe spindles without having to be fitted to the individual spindle. The taper pilot and the flat face on the spindle insures chucks and fixtures running true within a fraction of a thousandth of an inch even when transferred from one machine to another.

These spindles may be used equally well on the work-spindles of grinding machines, as well as on many types of special machines. Dimensions, specifications and working tolerances of these new lathe spindle noses are given in A.S.A. bulletin B5.9-1936, obtainable from the American Standards Association, 29 West Thirty-ninth Street, New York, or from sponsor bodies, at 50c. a copy. The standards on chucks and chuck jaws are contained in pamphlet A.S.A. B5.8-1936, obtainable from the same sources at 45c. each.

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FIG. 4—Six, 8, 10, 12, and 15-in. sizes of the new American Standard chucks. They are now obtainable from most chuck manufacturers.

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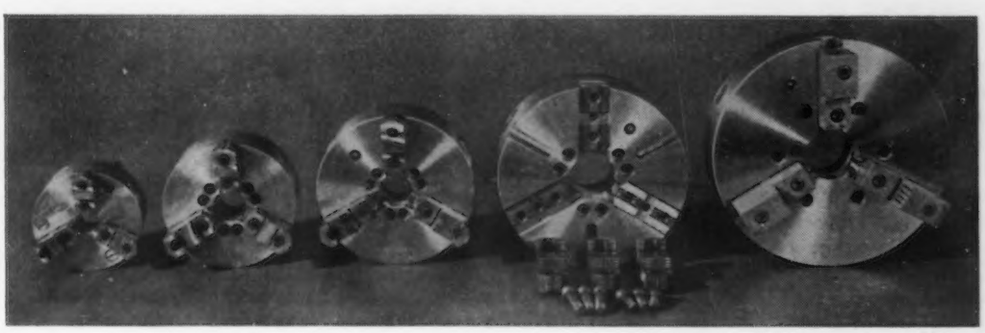


Balanced Type Machine for Quartering Locomotive Wheel Sets

By M. M. McCALL

SPECIAL machines for the quartering of locomotive wheel sets and the turning of crankpins while in position on the set have found an increasing market in the nation's railroad shops.

Successful operation of the locomotive running gear depends upon the accuracy of parallelism between the axes of the pins and the axle, accurate quartering, accurate positioning for stroke, and the absence of taper on the crankpins themselves. It is important that these accuracies are taken care of by the machine and are not dependent upon the operator.

It is a common experience in shops where a modern quartering machine has been installed to supplant older methods, to discover almost unbelievable errors in the quartering of their wheel sets when they are passed through the quartering machine for the first time. In many cases it is hard to understand how the locomotive running gear functioned properly with the existing inaccuracies in the individual wheel sets.

Fig. 1 shows a wheel set with right-hand lead in its normal balanced position as it rests upon the shop floor. The center line through the crank pin, axle and counterweight on the front wheel makes an angle of 45 deg. with the vertical center line and extends from the upper right to the lower left corner. A corresponding center line on the rear wheel also makes an angle of 45 deg. with the vertical center line but extends from the upper left to the lower right corner. It is obvious that if this normal balanced position is maintained during the handling of the set in the sling chains, and during the chucking and machining operations, there will be no tendency for the set to turn during these operations. This is the principle around which the new Niles balanced quartering and crankpin turning machine shown in the accompanying illustrations was designed.

FIRST detailed description of a new Niles "one man" machine designed to assure normal balanced position of the driving wheels during chucking and machining operations.

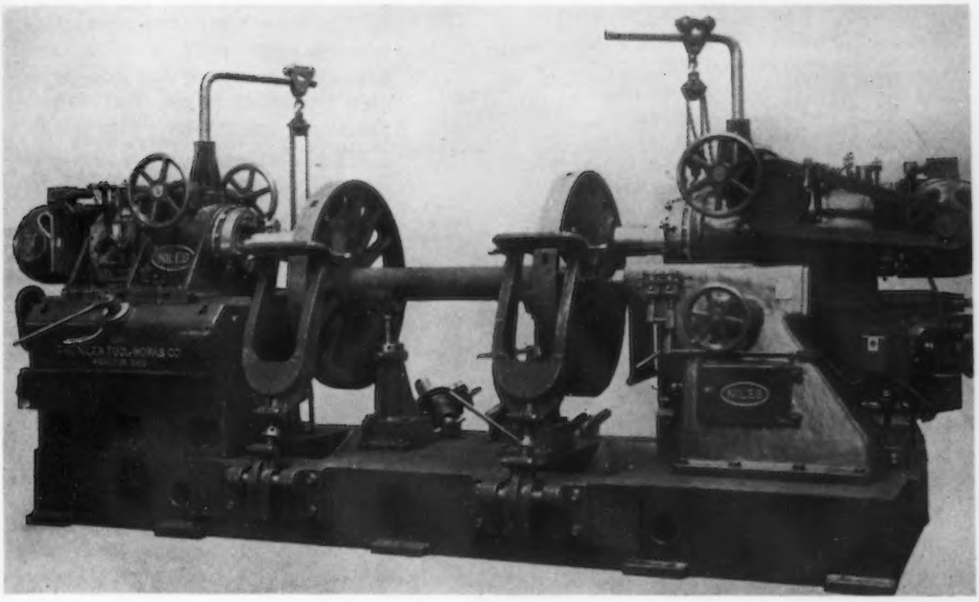
FIG. 1—Locomotive driving wheel set in its normal balanced position as it rests upon the shop floor with the counterweights down.

Figs. 2 and 3 show views of the opposite sides of the new balanced machine. The axle of the wheel set is placed on the adjustable V-blocks and centered from tailstocks at both ends. The V-blocks will handle axles up to 14 in. in diameter, and an additional set of blocks is provided to handle roller or ball-bearing axles with the outer races in place. The two tailstocks are similar and are bolted in fixed positions on the bed after being lined up by tongues and grooves.

Triangular Slides

At each end of the machine alongside the tailstocks, triangular bases are bolted to the bed. Each triangular base has ways planed to an angle of 45 deg. with the vertical. Each base is positioned with its ways parallel to the center line through the axle and crankpin on the wheel nearest to its position. The angle between the planed ways on the two bases is therefore 90 deg. A triangular slide is adjustable by hand along the 45-deg. ways of each base, each slide having horizontal ways planed on its top surfaces along which the headstock and its spindle are longitudinally adjustable.

The height of the planed surface on top of the slide and the height of the spindle center above the planed surface are such that as the triangular slide is adjusted



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AT LEFT

FIG. 3—In this view of the opposite side of the machine, the tailstock may be seen in the foreground at the right and the triangular base in the foreground at the left. Clamps for holding the wheel set are in position.

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along the 45-deg. surface of the triangular base, the center of the spindle will travel along a line passing through the center of the wheel set and making an angle of 45 deg. with the vertical center line. This angular adjustment along the triangular base is therefore the means by which the headstock spindle is set for obtaining the throw of the crankpin. The accuracy of this adjustment is obtained by hardened and ground-gage blocks which are placed between the triangular slide, upon which the headstock is mounted, and the base of the tailstock. A sufficient number of these gage blocks is provided to position the

AT RIGHT

FIG. 4—View of one end of machine. Tailstock is to the left; triangular base to the right. The triangular slide with the headstock is adjustable along the 45 degree surface of the triangular base to suit the throw of the crankpin.

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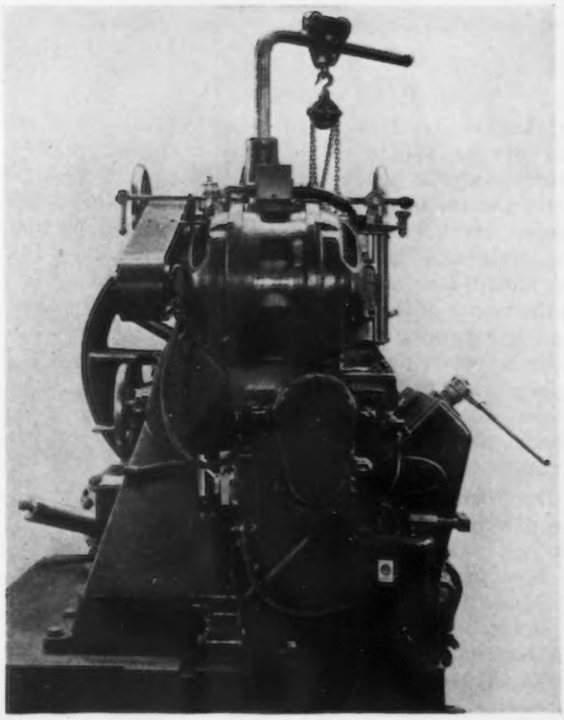
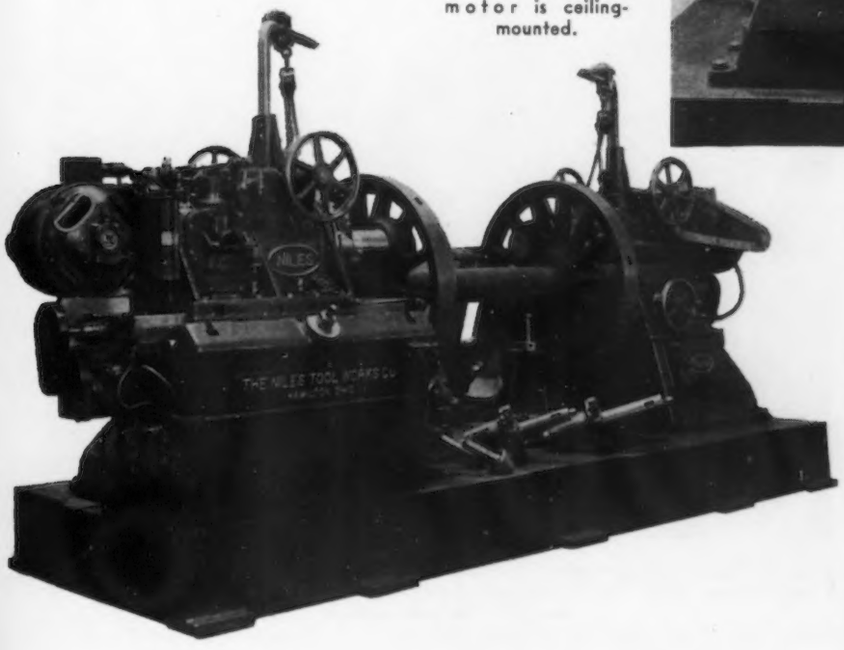
BELOW

FIG. 2—Triangular base at one end of machine is shown in the foreground. The spindle drive motor is wall-mounted on the rear of the headstock. The headstock power traverse motor is ceiling-mounted.





spindle centers for engine strokes ranging from 24 to 36 in. by 2 in. intervals.

Drive and Feed Mechanism

The drive and feed mechanism for each spindle is mounted entirely on the head stock and is entirely enclosed. Each spindle is driven by a 5-hp. motor with 3 to 1 speed range. If alternating current, a multi-speed motor is used. The motor drives the spindle by V-belts and a worm and worm-wheel, the wormwheel being mounted directly on the spindle. The driving worm shaft and the spindle are mounted

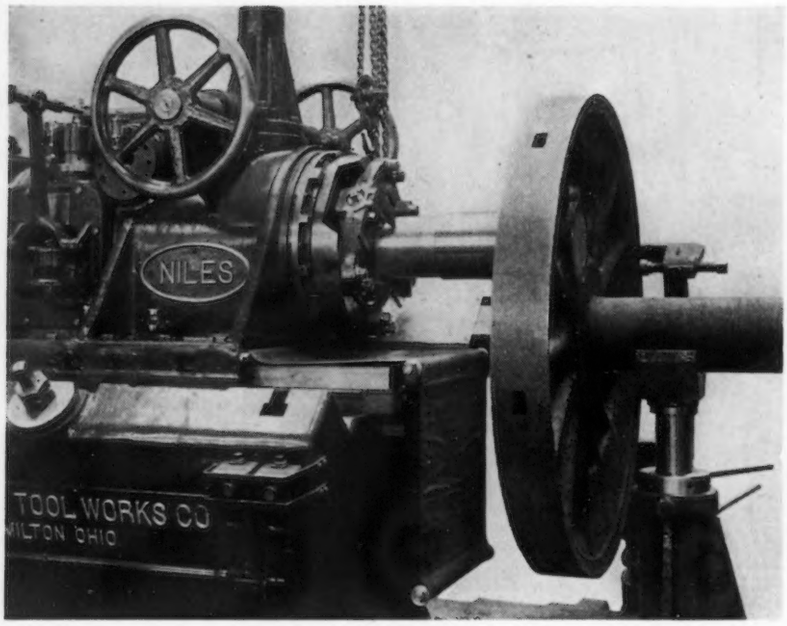


FIG. 5—Closeup view of crankpin turning operation. As the tools feed toward the wheel, the pin enters the hollow spindle.

on Timken bearings. The front end of the spindle is of large diameter and is hollow for the reception of the largest diameter and longest crankpins. The pin turning tools and burnishing rollers are mounted on adjustable holders at the mouth of the spindle. Change from pin turning to quartering is made by removing the tool holders and applying flanged members into which the boring bars fit, the flanged members being bolted directly to the mouth of the spindle.

The boring and turning feeds are driven from the small end of the hollow spindle. Four changes of feed are built into the headstock, the final feed drive being of a combined bevel gear and rotating nut on the feed screw which is positioned between the ways of the triangular slide. The feed screw has sufficient resistance against turning to cause it to remain fixed when the nut is rotated, which causes the headstock to feed along the slide. The feed mechanism is non-reversing and feeds in the direction of the wheel set. Hand feed is obtained from large handwheels, duplicated on each side of the machine for each head, which rotate the nut on the feed screw when the feed change lever is neutral. The feed change levers are arranged to be operated from either side of the machine, making either side the operating side and making it a one-man machine.

Rapid power traverse, in either direction to each headstock, is provided by 1-hp. gearmotors connected directly to the feed screws. When the screw is rotated, the nut will be prevented from turning by the locking action of a worm and wormwheel in the feed gear train. With this type of construction no interlock is necessary between the feed and traverse mechanism.

Both headstocks are of unit construction and are exact duplicates of each other.

To assist in handling the different tools when the operations are changed from turning and burnishing to boring and vice-versa, each headstock is provided with a small jib crane and chain block.

When the wheel set is centered in the machine, it is clamped by the heavy U-shaped clamps shown in Fig. 3, to prevent rotation.

Different Bases for Thirding

The machine may be arranged for thirding by the substitution of different triangular bases. Bases with ways planed to an angle of 60 deg. with the vertical instead of 45 deg. are substituted. When the same triangular slides with the headstocks are adjusted on these bases, the angle between the lines of adjustment at each end of the machine will be 120 deg. instead of 90 deg. When the machine is arranged in this manner, the minimum stroke of engine that can be thirded is 26 in.

When the crank axle wheel set of a three cylinder locomotive is being thirded, the journal of the inside crank may be turned at the same time with a special attachment which may be located on the bed-plate midway between the heads.

For use in locomotive manufacturing shops, the machine may be arranged to handle wheel sets with both standard and broad gage by making the units at one end adjustable along the bed plate.

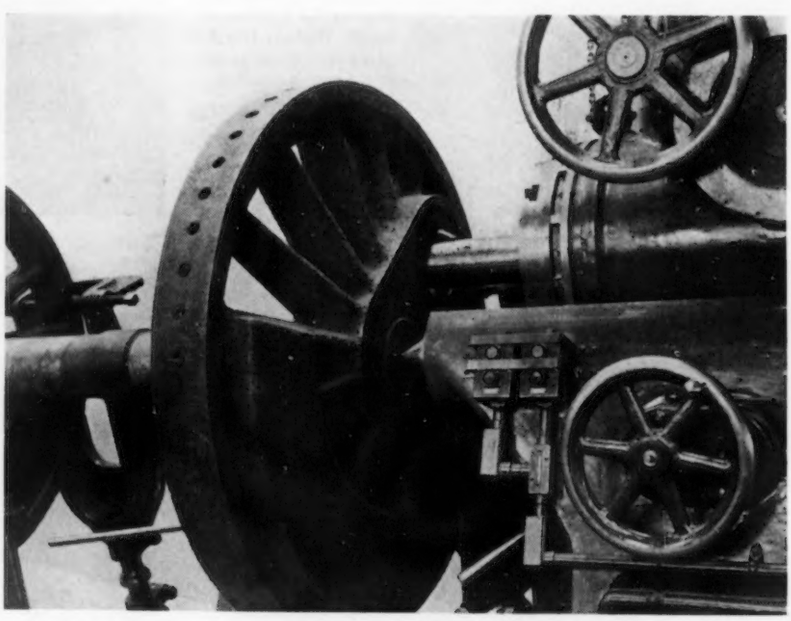


FIG. 6—Closeup of quartering operation. The boring bar and tool is about to enter the crankpin hole. The boring bar is held in a flanged member bolted to the mouth of the hollow spindle.

BENJAMIN F. FAIRLESS, President, Carnegie-Illinois Steel Corp. Drawn by John Frew for The Iron Age.

Present Scrap Prices Show Economy Of Briquetting Turnings and Borings

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By A. K. NOWAK
Baldwin-Southwark Corp.

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DEPENDING on the locality, present-day quotations of iron and steel scrap prices show differentials of $5 to $9 between cast iron borings and machine shop turnings on the one hand, and heavy melting steel on the other hand. The fact that turnings and borings are lower indicates that their true metallurgical remelting value, as compared with the remelting value of heavy melting iron and steel, is also proportionately less.

The lower value is caused by melting losses, due to oxidation and interference with the normal operation of the melting furnace and also with the desired analysis of the resulting melt. Chemically the borings and turnings are identical with the corresponding iron and steel, but physically, due to their aggregate state, a given weight of them has a combined surface a great many times more than the surface of the solid heavy melting piece of iron or steel of corresponding weight, which combined surface, when exposed to the hot furnace gases, causes this excessive oxidation.

Briquettes are highly compressed blocks of such cast iron borings or steel turnings. The former are compressed with pressures of as high as 60,000 lb. per sq. in., giving blocks, or briquettes, 4 in. in diameter by 3½ in. high, weighing approximately 9 lb. each, and of 75 per cent density compared with solid iron. The steel turnings are taken from the machine tools without crushing them and are compressed with 18,000 lb. per sq. in. pressure into briquettes 7 in. in diameter by 4 in. long, weighing approximately 20 lb. each, of 70 per cent density. As these turnings are compressed without crushing, an exceedingly strong briquette, capable of withstanding the roughest sort of handling without undue abrasion losses, is obtained.

The equipment required for a briquetting installation is very simple, consisting of the machine proper, storage facilities and conveyors for the borings or turnings and for the produced briquettes. The machine proper is fully automatic and operates in high speed, producing 12 to 18 cast iron briquettes or 5 to 7 steel briquettes per min. There are now 12 machines operating in various installations at prominent manufacturing plants, the first one having been installed in 1921.

The briquettes have fully proven their value by their continuous use over a period of many years. For cast iron borings, the following facts have definitely been proven by experiment and actual practice.

No detrimental effect on the quality of the metal itself or on the percentage of good castings produced can be found when using up to 20 per cent borings briquettes in the cupola charge.

The machinability of the resulting castings is not in the least impaired.

No additional flux or any additional coke are necessary in the charge. There is no change in the melting rate of the cupola nor in the temperature of the iron at the spout or in the foundry.

The briquettes melt much as does any other heavy melting scrap in the cupola. They do not disintegrate in the melting zone, as has been evidenced many times by the bottom drop at the end of a heat.

Steel turnings briquettes are used in cupolas as addition to iron charges, in electric and open-hearth furnaces. In the cupola and electric furnace they melt as any other heavy melting scrap. In open-hearth furnaces they have shown distinct advantages in a 20 per cent faster melting rate, less height of the charge on the furnace bed, less handling, less charging boxes, and shorter charging time. Most turnings are covered with cutting oil or compound and in one particular installation this fact resulted in a considerable saving by permitting substitution of a considerable percentage of pig iron with these briquettes without loss of carbon in the melt.

The practice of producing and remelting these briquettes is continuously extending and the prediction can be confidently made that at some future date a large portion of the available cast iron borings and steel turnings will be melted in briquette form.

Stainless Steel Bank Vault

UTILIZING the outstanding characteristics of stainless steel to the utmost, the Farmers Deposit National Bank, Pittsburgh, recently installed a bank vault which required 15 tons of stainless steel. No. 11 gage stainless Allegheny metal sheets and half-inch plates were used in the construction of the bank vault which was fabricated by the York Safe & Lock Co.

Lifting-and-Shifting Equipment for Light Loads

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By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

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ON the preface page of a handsome booklet recently issued by a manufacturer of materials handling equipment appears this quotation: "The biggest cost savings of today and tomorrow are likely to come from moving rather than from making. This is the decade of mechanical transportation." As a keynote this statement is infinitely sounder and more sagacious than all the labored "keynotes" of political party conventions, in Presidential years or otherwise. Like a majority of self-evident truths, however, it is apt to be taken in the same spirit as when mother fed us sulphur-and-molasses in the early spring.

The subject of mechanical materials handling deserves more widespread recognition; first, because it provides one of the chief reducible items of labor cost, second, because it holds the key to logical methods of speeding up production without resort to inhuman slave-driving tactics, and third, because by lightening labor it promotes a greater degree of care on the part of the machine operators, with a resulting better quality of workmanship.

The movement of materials and parts from process to process in the manufacturing plant, and particularly the placing of work in or upon machines is a job calling for the use of the lowest grade of unskilled labor. The effort involved comes entirely from below the neck; no brains are used. To require skilled labor at high rates of wages to perform these tasks even in part by the use of muscular effort alone is a sheer waste of money, to say nothing of the slowing down of productive processes. The substitution of mechanical handling methods for human muscle may temporarily displace unskilled labor on the one hand, or release skilled labor on the other for increased productive effort. In either case it yields a production dividend which eventually, as money circulates faster, provides other jobs for the unskilled laborer and increases the value of the skilled mechanic. This is the fundamental economic fact, so often proved that it is today beyond all question: Decreased production costs permit lower prices for product; low product prices, so long as they include fair profits, expand markets; expanding markets result in increased employment.

The consideration and adoption of ways and means of lightening human labor through mechanical handling methods should not, therefore, be looked upon merely as a matter of the substitution of machinery for men. It should be regarded, rather, as a logical step in the progress of man toward a more complete mastery of the mechanical forces which have lifted him up from untold drudgery. The economic proof-of-the-pudding is that in so lightening his labors he is enabled to produce better things more rapidly. He profits, his employer profits, and the world at large profits likewise.

One of the principal ways in which this labor-lightening process has been made manifest lies in the development of hoisting equipment. The term "hoisting equipment" covers a very wide field—much too wide to be included within the limits of a single discussion. The subject must be divided into a consideration first of the simpler hoisting equipment available for the lifting and shifting of loads up to about 10 tons, then the larger cranes especially designed for very heavy work, and finally the very special but infinitely useful combi-

nation of trolley-hoists and overhead monorail trackage.

Chain Blocks

Probably the simplest approach to the whole subject is by way of the hand hoist. After the primitive developments evolved from the rope-and-pulley, and the block-and-tackle, the first of the modern mechanical lifting means came in the family of chain blocks. There are three members of this family; the differential hoist, the screw-geared hoist, and the spur-geared hoist. Their construction and functions are briefly outlined as follows:

The differential hoist is a direct adaptation of the block-and-tackle. An endless chain runs in the chain pockets of two sheaves; the upper one containing two chain grooves, and the lower, smaller in circumference by one or two chainpockets, one chain groove. Pulling the free portion of the chain over the upper sheave raises or lowers the load. (All chain hoists are designed to hold the load securely at any point; only by pulling on the chain may the load be moved. No such checking action is found in the block-and-tackle.) The differential block is the simplest of all chain hoists. It is intended for light, intermittent service rather than hard continuous usage. It is essentially a portable hoist, and the head block is therefore generally built with a supporting hook to enable it to be hung wherever required.

The screw-geared hoist has two chains; a light hand pull-chain which goes over a single groove, pocketed hand-wheel attachd to the screw-shaft, and a heavier double load-lifting chain which runs from two small pocketed pinions attached to either end of the screw-gear shaft, and ends at the lifting hook. The screw-geared hoist is more powerful than the differential block, although slower, and is often preferred where headroom is restricted. Because of its very smooth lifting action its use is advantageous where exact positioning of the load is required, or where there must not be the slightest jerking in either starting or stopping.

The spur-geared hoist is the most efficient type of hand block, and is ideal for raising the greatest weight with the least effort. The light hand chain goes over a wheel in the head block attached to the central pinion of a spur-geared (or

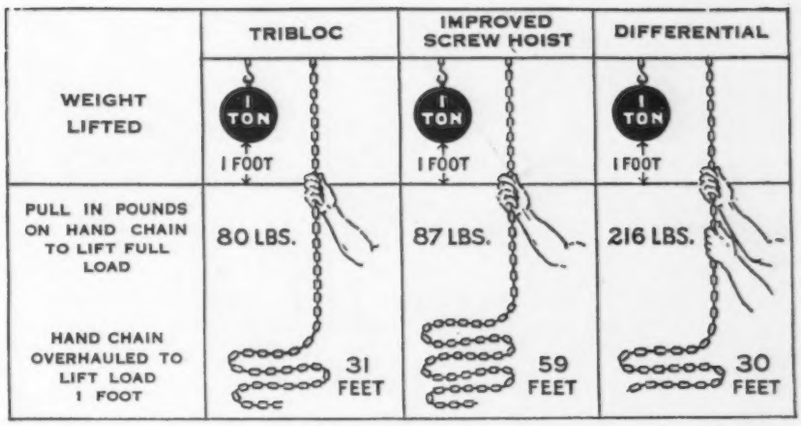

FIG. 1—Comparison of speed and effort to lift one ton one foot by means of various types of chain hoists.

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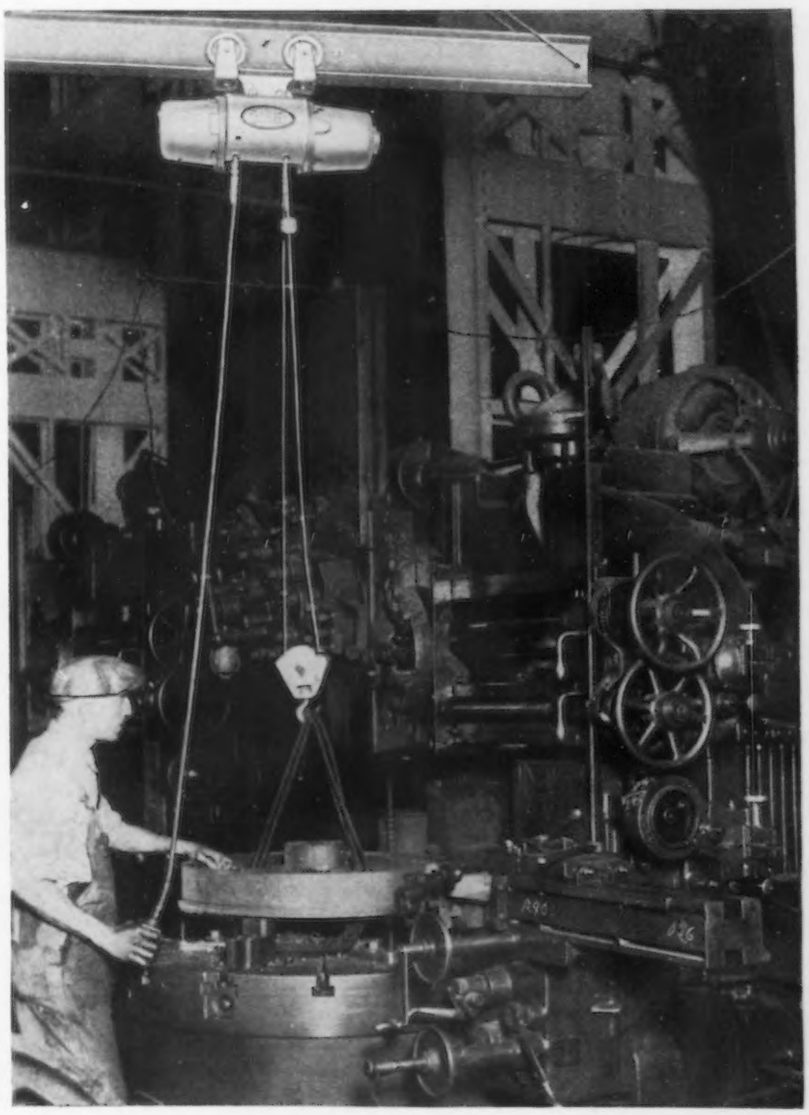
FIG. 2—Harnischfeger "Zip-Lift" electric hoist, push button controlled, placing work on a vertical turret lathe. o o o



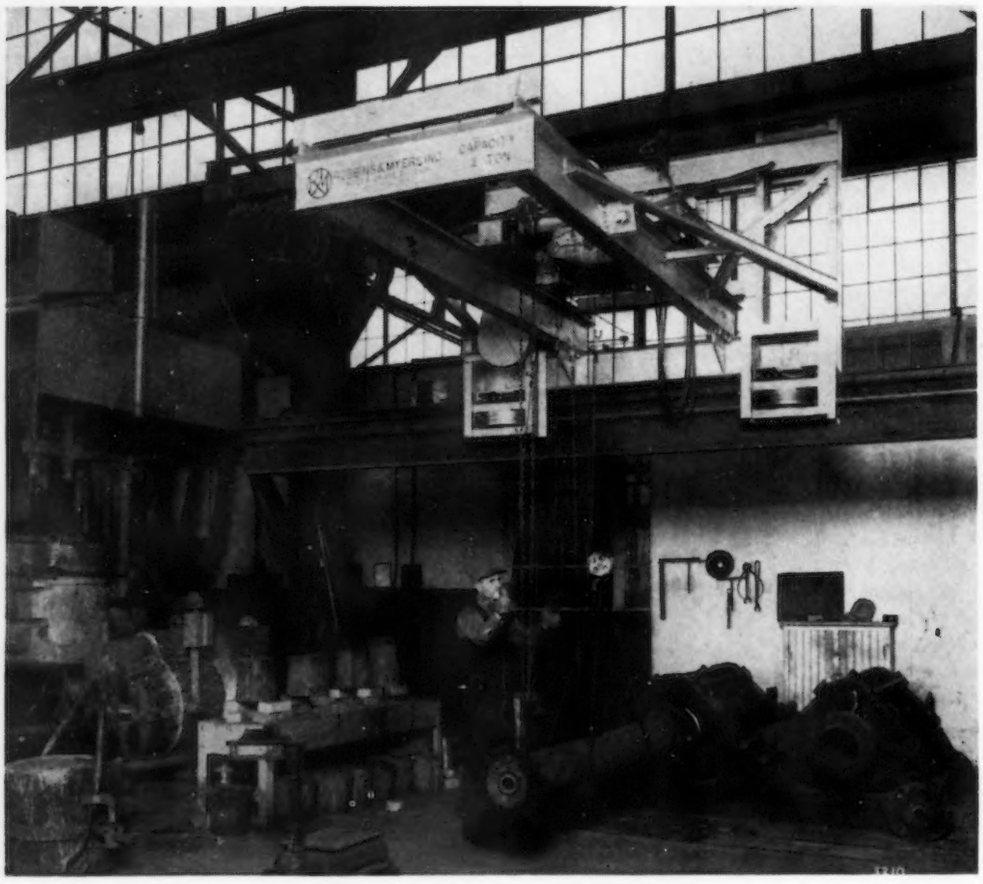


FIG. 3—Robbins & Myers 2-ton, two-speed hoist, operating from a 14-ft. reach wall bracket jib crane without interfering with standard crane service.

"planetary") transmission. The driven shaft of this transmission carries a small pocketed sheave over which the single, heavy load-lifting chain runs. One end of this chain is permanently fastened to the head block, the other carries the load hook.

A comparison of the speed and amount of labor required to lift one ton one foot by the use of Ford chain blocks of these three types (these blocks are representative of all makes of chain blocks) is given in Fig. 1. Differential blocks may be had up to three tons lifting capacity; screw-geared blocks up to 10 tons capacity, and spur-geared blocks up to 20 tons capacity. Normally the block is fitted with a hook integrally built into the head block, but practically all sizes of each type are commonly used with hand trolleys instead of head-hooks.

Chain blocks are *hand-powered* mechanisms, and as such their principal advantages are to be found in intermittent use. Where use is frequent (and the distinction between "intermittent" and "frequent" is one that varies greatly according to the class of work and the place of service) an electric or pneumatic hoist will be preferred.

Light Electric Hoists

Skipping for the time being the whole subject of trolleys and monorail overhead trackage systems, since that will be discussed in another article, it should be noted that the electric motor was applied to the chain block to make an electric hoist, for three reasons: (1) To gain speed, (2) To gain power, and (3) To gain flexibility of operation. In general, two construction principles of the chain blocks were used in the development of the electric hoist—the screw-geared mechanism and the planetary transmission. The latter is practically confined to the electric chain hoist, in capacities seldom exceeding five tons. Spur-gears in trains, however, are used in wire rope hoists up to 10

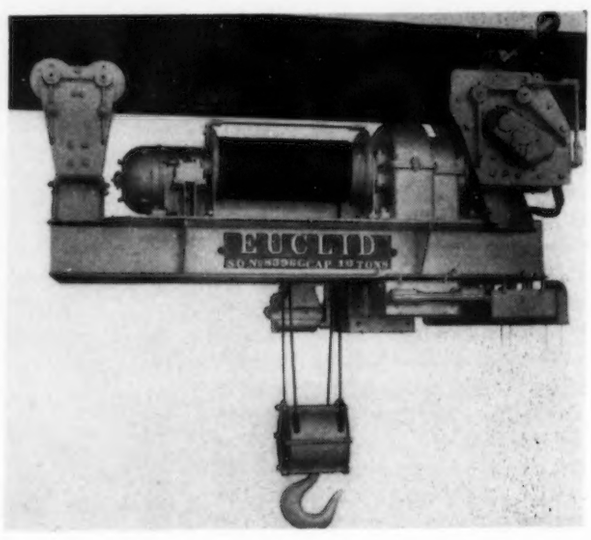


FIG. 4—Euclid 10-ton, floor operated monorail electric hoist as used in the Middletown Air Depot, Middletown, Pa.

tons or more. The screw-geared principle, and its companion, the helical gear, in many adaptations is more commonly used for wire rope hoists in capacities ranging from a fraction of a ton up to many hundreds of tons.

The number of styles of electric wire rope hoists is legion. A few only of the principal variations can be mentioned here, and these principally to illustrate particular features of use.

Fig. 2 shows a Harnischfeger "Zip-Lift" hoist, trolley-mounted on a swinging jib crane and controlled by push buttons, as used in a machine shop to place work on a Bullard vertical turret lathe. The hoisting speeds available with this equipment are up to 40 ft. per min. for loads up to ½ ton in weight. The control is so sensitive that the load may be "inched" into position with ease.

The 1937 Annual Review issue of THE IRON AGE contained (in the Materials Handling section) a description of a new electro-lift hoist providing remarkably close headroom between the lifting hook and the overhead track. With a hoisting speed of 60 ft. per min. and capacities of ⅛ and ¼ tons, this type is especially adapted for the rapid handling of small loads in volume production plants such as may be found in the automotive industry.

The American Engineering Co. "Lo-Hed" electric hoist is available in a wide range of capacities, all with exceptionally close headroom. Hoisting speeds vary from 40 to 80 ft. per min. in the ¼ and ½ ton capacities, to 10 to 16 ft. per min. in the 12 ton capacity hoists. The minimum clearance (headroom) between the inner curve of the load-lifting hook and the bottom of the supporting track in the smaller models is 13 inches. In the Robbins & Myers "Bantam" hoist of ¼ ton capacity, this same close headroom is to be had. The Robbins & Myers line of motor driven trolley hoists ranges up to 7½ tons capacity. Beyond that the line of light cranes operated electrically runs up to 10 tons capacity.

Shepard electric hoists are made in more than 5000 types and sizes, ranging from the close-clearance "Liftabout" to standard monorail and crane hoists of very large capacities. In a small booklet arranged alphabetically by commodities handled, Shepard-Niles Crane & Hoist Corp. illustrates 34 typical uses for electric hoists which embody scores of ideas for economical materials handling methods.

Close clearance hoists of excellent design may also be found among the products of other hoist manufacturers, notably Detroit Hoist & Machine Co., whose complete line is exceptionally varied and covers capacities from ¼ ton to 12½ tons in electric hoists, and includes pneumatic (air-motor) hoists up to 10 tons capacity.

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FIG. 5—Harnischfeger 5-ton crane hoist enables a single operator to put a heavy piece of work on a radial drill quickly, easily and accurately.

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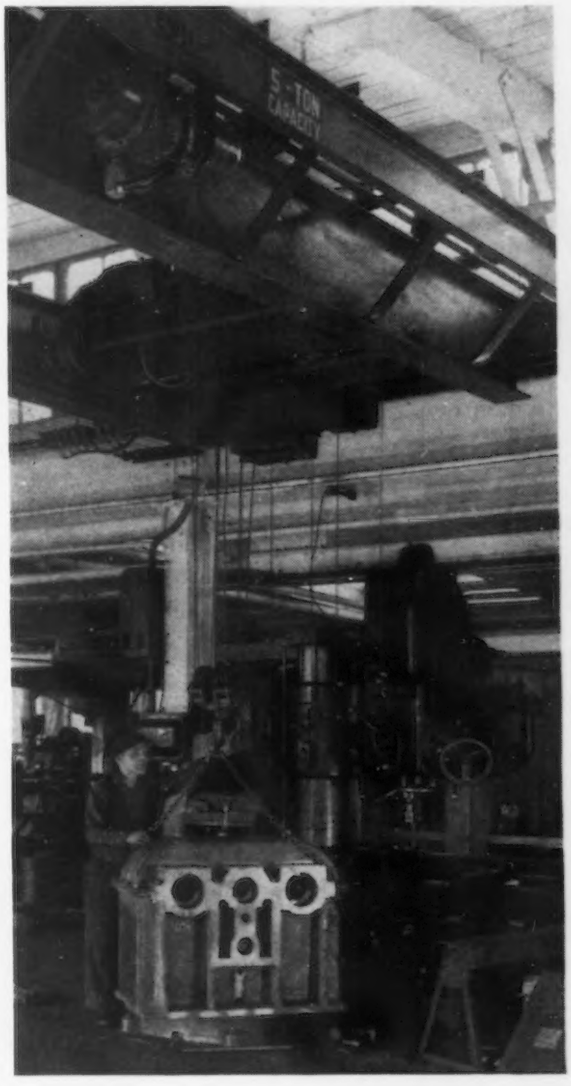

Electric Hoist Installations

A very unusual Robbins & Myers installation is shown in Fig. 3. In the main bay of a large steel foundry, served by a battery of standard bridge cranes, it was found advisable to provide auxiliary hoisting service for small work in a fairly limited area at one side of the bay. The unique wall bracket jib crane shown was designed to meet the needs exactly. Without interfering in any way with the service of the large standard cranes, this two-ton capacity, 14-ft. reach jib crane does a great deal of work which would otherwise require the use of the large cranes. Two-speed motor control permits creeping speeds for one type of work, and high speed for rapid handling. The jib crane can be moved longitudinally along the vertically superposed tracks, and the hoisting unit transversely on the crane to reach any spot within an area of 100 ft. by 14 ft.

Fig. 4 shows a Euclid Crane & Hoist Co. 10 ton floor-operated monorail electric hoist as installed at the Middletown Air Depot, Middletown, Pa. This picture illus-

trates the new tendency in hoist and crane construction. The main frame on which the hoisting mechanism rests is of steel plate welded into a box-like structure, and the driving trolley and idle trolley are both constructed of welded steel plate, heavily ribbed.

In Fig. 5 a typical Harnischfeger 5-ton crane hoist is placing a very heavy piece of work on a big radial drill. The most delicate control is essential in such an operation. Think of the awkwardness and possibilities of damage if this were done by hand! Here one man handles the whole job, accurately, quickly and easily.

Fig. 6 shows a 5-ton Robbins & Myers two-speed push button control electric hoist designed for special conditions of limited headroom, sharp runway curves, very accurate speed control and limited side clearances. With the special double sling hoisting rig illustrated, this hoist handles long rolls around columns and into and out of machines in a rubber plant where space is at a premium in every direction.

Fig. 7 illustrates a Whiting Corp. three-motored "Tiger" crane of 7½ tons capacity in a paper storage bay. A special motor-operated grapple is used for handling the rolls. The span of this crane is 80 ft. and the available lifting height is 35 ft. Incidentally this is an excellent example of the way in which storage space is coming to be utilized on a cubic foot basis instead of merely a square foot basis. These rolls may be stacked 10 high without damage.

Hoist Selection

In the matter of selecting a hoist for any particular duty there are five important points to be considered.

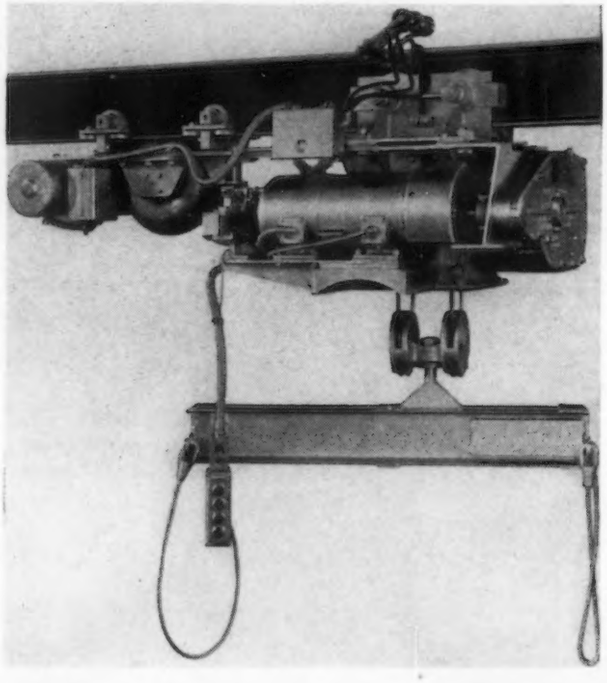

FIG. 6—Robbins & Myers 5-ton two-speed push button control hoist designed for special conditions of limited headroom and side clearances in a rubber plant.

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BELOW

FIG. 7—Whiting Corp. 7½ - ton "Tiger" crane hoist with separately motor controlled hoisting rig to handle rolls of paper in storage.

1. The capacity of the hoist must be determined by the maximum weight to be lifted. All hoists are rated primarily by lifting capacity. Consideration should also be given to the carrying capacity of the means to be used for supporting the hoist to make sure that it will carry safely the maximum load. This refers, of course, to the hook or bolt connection, the trolley rail or jib crane, or the traveling crane from which the hoist is to be suspended.

2. The hoisting speed required is the next consideration. Where time is a factor, as in most production or assembly work, the faster hoisting speeds are essential. For intermittent service, slower hoisting speeds (usually costing less) may meet all requirements.

3. The maximum height of lift required should be determined on the various jobs for which the hoist may be used. If the distance between the hook in its upper limit position and at point of load lifting (allowing for the slack required to engage the hook in the load) is greater than the standard lift of the various hoists available, a special lift hoist will be required.

4. The type of suspension deserves serious study. If the hoist

(CONTINUED ON PAGE 82)

Controlling Production By Means of Standards

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By FRANK H. LEONARD
Supervisor of Standards, Pneumatic Scale Corp.

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WHEN considering the organization and functions of the Standards Department as developed here it is necessary to do so in conjunction with a clear understanding of the type of product which is produced. That is, this company builds a wide variety of highly specialized functional machines for packaging and bottling operations. And although these machines are partially standardized they must be built according to customers' requirements, which means that the final assembly is rarely, if ever, twice alike for any two orders. Furthermore, the manufacturing quantities are never large. These two conditions, of course, greatly influence all phases of the management problems and the matter of setting standards is no exception.

Basically, the functions of this Standards Department are much the same as for any large machine shop with special adaptations to meet the special conditions existing here. Operation Sheets are prepared which specify the methods to be followed by the shop in producing the various parts which make up a completed machine. These sheets also show the standard time for performing

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FIG. 2—Operations sheets are constructed whenever the Engineering Department issues a new drawing.

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PHOTO. SCALE CORP., LTD. NORFOLK DOWNS, MASS.

OPERATION SHEET — MACHINE: L.F.M. — PART NAME: L.H.Side Frame — PART NO. 67078

COMPILED BY: J.S. — DATE: 11/5/36 — REVISED:

MATERIAL: Cast Iron — SIZE: — WEIGHT: 215 — FEET TOTAL WEIGHT: 1075 — MAKE QUANTITY: — AVERAGE QUANTITY: 5

SCHED. DATE	OPER. NO.	DEPT.	TYPE OF MACHINE	OPERATIONS AND INSTRUCTIONS	TOOLS USED METHOD OF RESTRICTION	STANDARD TIME SET-UP	STANDARD TIME PIECE	ACC. MIN. QUANTITY
	1	Snag		Snag and file cored holes				
	2	Mill	4X12	Plane pads on one face	Table	42	122.0	
	3		"	Plane opposite face and edge	"	37	84.0	
	4		B.M.	Mill end pads	"	35	14.2	
	5		"	Bore and ream holes (3)	" angle	105	100.0	
		C.H.		Deliver #67078			-	
	6	Drill		Layout holes		24	40.0	
	7		R.D.	Drill,c'bore surface and tap		35	42.0	
	8			Chip oil groove			-	
	9			Locate and press bushing in plane			-	
	10			Ream to size if needed			-	
		Insp.		Inspect				
				Make with #67071		278	387.2	

REFERENCE NUMBERS: 67071 — SUMMARY

J&L - Turret Lathe Bar Work

	Centered Not Ground Set up	Hand.	Centered For Grinding Set up	Hand
	Cut off and chamfer			
	Cut off & chamfer one drill and tap			
	Cut off & chamfer two drills & tap			
	One shoulder and center			
	One shoulder, one drill and tap			
	One shoulder, two drills and tap			
20p.	One shoulder on each end & center			
	One shoulder on each end, one drill & tap			
	One shoulder on each end, two drills & tap			
	Two shoulders on one end			
	Two shoulders on one end, one drill & tap			
	Two shoulders on one end, two drills & tap			
20 p.	Two shoulders on one end, one on another			
	Same with one drill and tap			
	Two shoulders on both ends			
	Same with one drill & tap			
	Three shoulders on one end			
	Three shoulders, drill and tap			
	Thread one end			
	Thread one end, drill and tap			
	Thread one end, two drills & tap			
20p.	Thread both ends same thread			
	Thread both ends different thread			
	Add for 1 drill and tap			
	Add for 2 drills and one tap			
	Pipe. Thread one end - no center			
	Pipe. Thread both ends. Same thread.			
	Conn. Rod. Turn 2 ends & thread-no center			
	DIE HEAD			
	3/8 to 1-1/4 dia.6.40 min. 1-1/4 to 2 dia. 12.7 min.			
	Spur gear			
	Cam roll no recess			
	Cam roll with recess			
	Spur gear or ratchet, no hub. 2 drills			
	Sprocket - one hub			
	Sprocket - two hubs			
	Large Hex nut 3 operations			
	Collar over 1-1/4 dia.			

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FIG. 1—Time allowances are specified on group charts such as this for various related operations.

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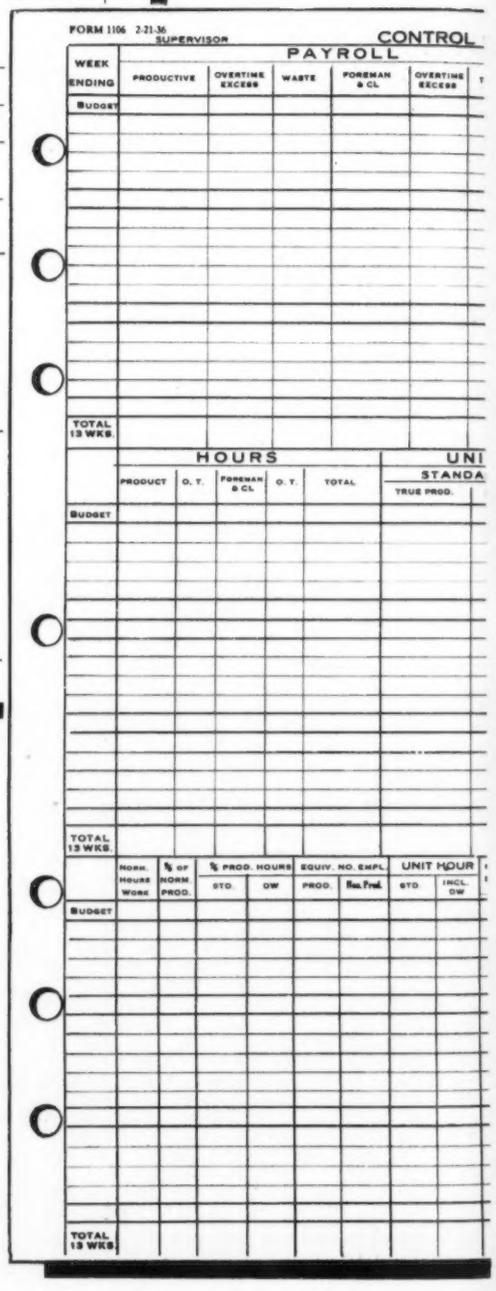

these operations, based on standard data compiled from careful time studies, and also set the standards on which the bonus payments to the operators are made.

Let us consider a turret lathe job, for example. In laying out the time for a job like this a Group Chart (Fig. 1) is used which gives the time for boring holes of different diameters and lengths on machines actually in the shop, and based on feeds and speeds which have been predetermined for standard tooling. This is a summary sheet and is the only one used by the Rate Setter in calculating the time for a given job. Similar sheets are used for set-up time. Both types are on a per piece basis.

When the Engineering Department issues a drawing for a part which has not been made before the Methods Division of the Standards Department prepares an Operation Sheet (Fig. 2), and attaches it to the drawing. This work is done by a man who specializes in such planning. This is then sent to the Rate Setter, located in the shop, but a member of the Standards Department. The Operation Sheet gives the sequence of operations and the Rate Setter sets the time for each operation. He gets his information from the Standard Data Group Sheets al-

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FIG. 3 and 4—Two Control Sheets are given to the foreman each week, itemizing performance on all jobs in his department.

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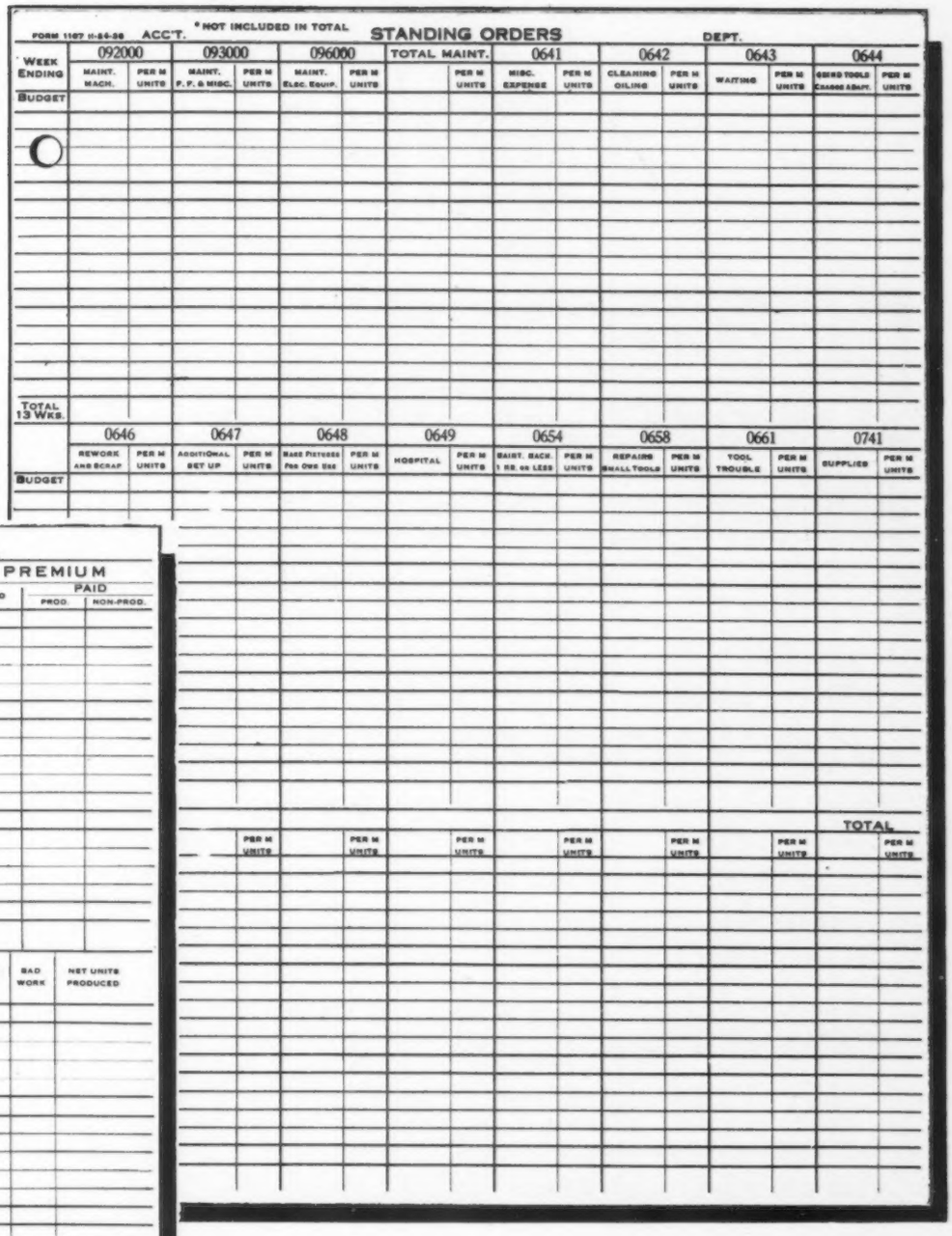

FORM 1107 11-24-36 ACC'T. * NOT INCLUDED IN TOTAL **STANDING ORDERS** DEPT.

WEEK ENDING	092000 MAINT. MACH.	PER M UNITS	093000 MAINT. P. P. & MISC.	PER M UNITS	096000 MAINT. Elec. Equip.	PER M UNITS	TOTAL MAINT.	PER M UNITS	0641 MISC. EXPENSE	PER M UNITS	0642 CLEANING OILING	PER M UNITS	0643 WAITING	PER M UNITS	0644 GRIND TOOLS Change Adapt.	PER M UNITS
BUDGET																
TOTAL 13 WKS.																

	0646 REWORK AND SCRAP	PER M UNITS	0647 ADDITIONAL SET UP	PER M UNITS	0648 MAKE PATTERNS For One Use	PER M UNITS	0649 HOSPITAL	PER M UNITS	0654 MAINT. MACH. 1 HR. or LESS	PER M UNITS	0658 REPAIRS SMALL TOOLS	PER M UNITS	0661 TOOL TROUBLE	PER M UNITS	0741 SUPPLIES	PER M UNITS
BUDGET																
															TOTAL	
		PER M UNITS		PER M UNITS		PER M UNITS		PER M UNITS		PER M UNITS		PER M UNITS		PER M UNITS		PER M UNITS

SHEET ACC'T. NO. DEPT.

TAL EARNED	CHARGES FROM STDS. ORDERS	OPERATING COST	PREMIUM EARNED	PREMIUM PAID PROD.	PREMIUM PAID NON-PROD.

THIS WEEK ON THE ASSEMBLY LINE

. . . Thirty sit-downs in three weeks tax patience of General Motors; UAW warned by Knudsen.

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. . . Reopening of G. M. peace pact is aim of Martin with object of increasing representation on shop committee.

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. . . Ford personnel director, Harry Bennett, escapes death when hoodlums force car into ditch.

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. . . Truck price increases are first straw in wind indicating a general rise.

DETROIT, April 6.—The outcome of Chrysler negotiations with the UAW still is the center of interest in the automotive industry, but Michigan's strike picture has by no means been painted yet. Of greatest importance is General Motors' demand on the union for a showdown on the question of the crippling strikes that have tied up General Motors plants 30 times in the three weeks since the corporation and the union reached their agreement on March 12.

W. S. Knudsen, executive vice-president of General Motors, handed a letter containing the demand to Homer Martin last Friday when six General Motors plants were shut down by unauthorized strikes. This sent Martin scurrying to Flint to clear out the strikers so the shops could reopen this week. Knudsen capped his attack on the UAW with the written charge that the union is using coercion and intimidation despite the union's agreement not to use such tactics nor to solicit and sign up members on the premises of the company. Without putting words into Mr. Knudsen's mouth, it is possible to interpret this as confirmation of the suspicion that many of the short-time departmental sit-downs have been moves on the part of shop stewards to "line up" union members. Union officers admit being embarrassed by these strikes but don't like to concede that there are too many generals in their organization. Instead they are now trying to occupy minor union officials, such as the stewards, with tasks that will keep them too busy to meddle with affairs of state.

To this end, the UAW is already trying to throw overboard parts of the final General Motors pact and to provide places on the shop committee for more unionists. As an example of the present set-up, Chevrolet Flint plants, with 14,000 workers, have a committee of 17, only nine of whom actually participate in conferences under terms of the General Motors pact. Enlargement of the committee would give scores of stewards some extra duties. Martin actually is aiming at reopening the General Motors agreement, but under its terms he cannot do so until Aug. 11, allowing the six months specified in the original paper signed Feb. 11 in Judge George Murphy's court in Detroit.

The only alibi offered for these distinctly illegal stoppages of production is that given by Martin. He said that there had been frequent violations of the agreement by General Motors plant managers and foremen. Through an off-hand remark, he suggested that Mr. Knudsen probably is having as "much trouble selling the agreement to his people as I am with the workers."

Hudson's Position Adamant

Quietly, Hudson Motor Car Co. is staging the first management sit-down on record. Company spokesmen deny that they want the Chrysler negotiations to be a pattern for their strike settlement, insisting

that their refusal of sole bargaining privileges to the UAW is final. The union, for its part, says the next move is up to Hudson. Problematical, of course, is the pressure that might actually develop as a result of the Chrysler settlement, and a Hudson spokesman admits that. With a three weeks' supply of new cars still on hand, the company can afford to wait a while.

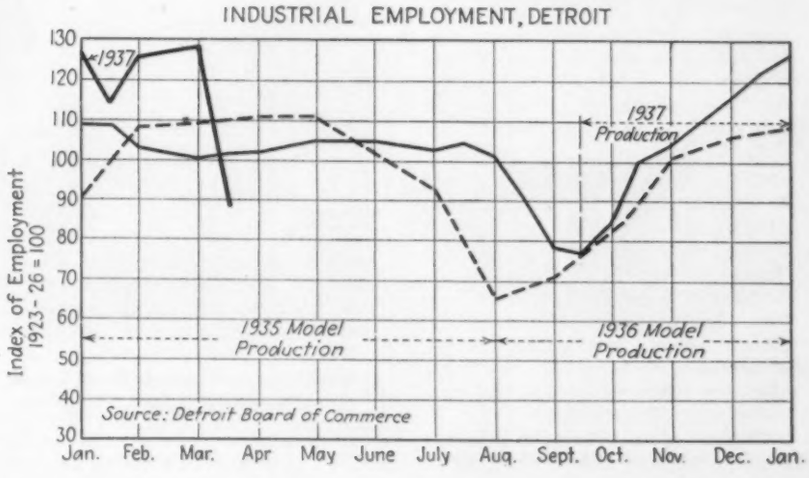
All last week the Chrysler people, the UAW crowd and Governor Murphy simply marked time and each had good reasons for the layoff. For Chrysler, the time element is particularly important since delay is having a definite and apparent effect on the strikers' morale. The regular relief load of the City Welfare Department has jumped 1500 cases as the result of Detroit strikes. Emergency relief, not included in figures on the regular case load, has cost the city $4,000 a day for a few days, whereas early in March it was about $500 a day. Non-payment of rents had 200 eviction cases on the docket of the Circuit Court Commissioners, and most actions were attributed directly to strikes or layoffs caused by strikes.

John L. Lewis has had time to clear his slate with the United Mine Workers, and now is in a better position to try to defend his UAW in this battle which many think will cause the auto workers considerable loss of face. Lewis, for his part, could not have risked this while his coal pact was unsigned.

With an election Monday, last week's lull pleased Michigan Democrats and Governor Murphy, giving them a chance to quiet the party's supporters and lend a tone of peace that has been lacking lately. After being warned a few weeks ago that the breakdown of law and order imperiled the Democrats in this election, Murphy put in some last minute appearances at rallies and did some speechmaking to defend his labor policies.

Chrysler and Hudson office workers felt the axe when they were sent home March 31, many of them with instructions to look elsewhere for work. At Hudson's, UAW sound cars broadcast appeals to them to join the union. Sound car orators also issued threats to shut out remaining office workers today, so steps were taken in offices to protect company records. Many Chrysler suppliers got 'phone calls from their friends at Chrysler asking them to wire their sentiment to the Governor when the peace parley reopened.

While waiting, all parties concerned had time to conjure pictures of what might happen after the Supreme Court has ruled on the Wagner Labor Act. Any attempt at sole recognition in some Detroit plants will be met by crucial inter-union battling. Already both the Mechanics Educational Society of America and the new Society of Tool and Die Craftsmen are in arms against the UAW. Fighting words, "scab" and "strikebreaker," were tossed as the MESA picketed the National Stamping Co. plant, where the UAW claims a closed shop agreement. Matthew Smith, executive secretary of the MESA, charges collusion of the management and the UAW while the MESA was picketing—"if there is a closed shop agreement." Smith claims 200 adherents in the plant. Strangest of all set-ups is a local shop which has two "majorities," one union dominating the night



shift, another union controlling the day men. At the National Stamping Co., MESA won representation for die workers and 10c. raise. UAW and MESA represent production workers jointly under new agreement.

Ford's sit-down problem is just coming to the front, starting with the Kansas City assembly plant strike last Friday. Earlier in the week it was revealed that Harry H. Bennett, personnel director of the Ford Motor Co., narrowly escaped death March 22 when his car was forced into a ditch near the Ford administration building. Bennett, shaken but unhurt, was close-mouthed about the incident. The only other sign of violence in the local situation is the alleged beating of Gerald Corkum, a former union officer, once labeled "typical automobile worker" in a magazine contest. UAW men now call him a spy, but disclaim having beaten him.

Higher car prices are on the way, and no one seriously denies it, although the idea is being soft-pedaled. When the changes will be announced, however, is anybody's guess since no pleasure car manufacturer wants to lead off. Diamond T and Federal Truck faced the inevitable this week and quietly hiked prices about 5 per cent. Plenty of justification is indicated by increased costs, of course.

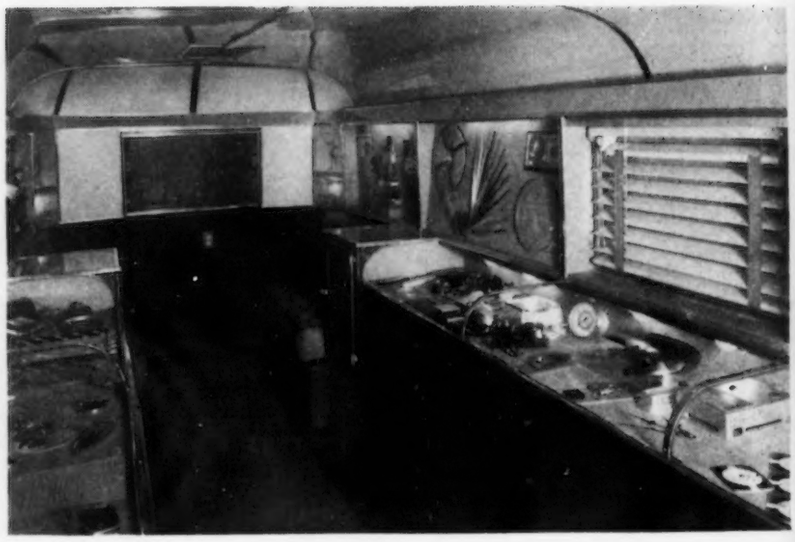
The spring selling season is already here and, with the restrictions imposed by strikes, there is little hope that volume could possibly be large enough to offset increased costs. It is this combination that is about to force automobile men to forsake their traditional policy of holding prices down. In addition, dealers are seriously worried by reports that their own men are unionizing in salesrooms and garages.

Output of passenger cars and trucks followed the strike curve again this week, and dropped to 96,710 units, from 101,115 last week, according to Ward's Automotive Reports. The total for the corresponding period last year was 106,324. The new General Motors strikes cut outputs from 52,650 last week to 48,925. Ford pushed assemblies up to 32,825 from 32,450.

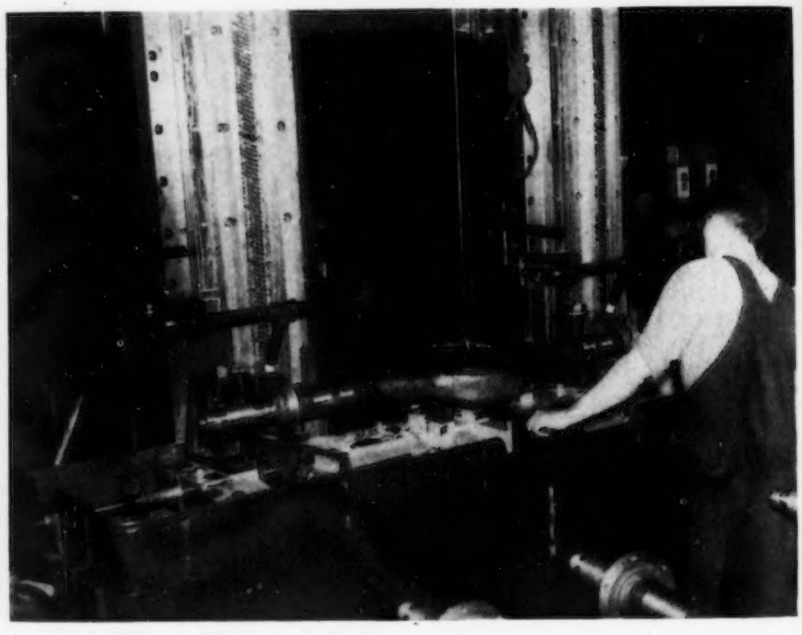
Lake navigation is gradually opening. Two steamers, the Adam E. Cornelius and the Lake Chelan cleared from Buffalo for Detroit Friday with pig iron cargoes. A steel cargo was being loaded at the Bethlehem Steel plant dock at Buffalo. Ice is being broken in the Straits of Mackinac, preparatory to passages on April 15. The Saginaw Bay area, important commercially, opened Saturday.

Closing of the Chrysler Windsor plant because of lack of parts from the American side of the river brought orders to stop steel deliveries. Meanwhile, steel men generally are anticipating a difficult session when Chrysler does resume operations and demands rush deliveries of big tonnages. All the suppliers will try to oblige, but present mill schedules are going to make it difficult. Ford has not been in the market recently, and probably won't be for several weeks. His last buy was intended to supply him for 1,000,000 cars on the 1937 run and will carry him well into July assemblies.

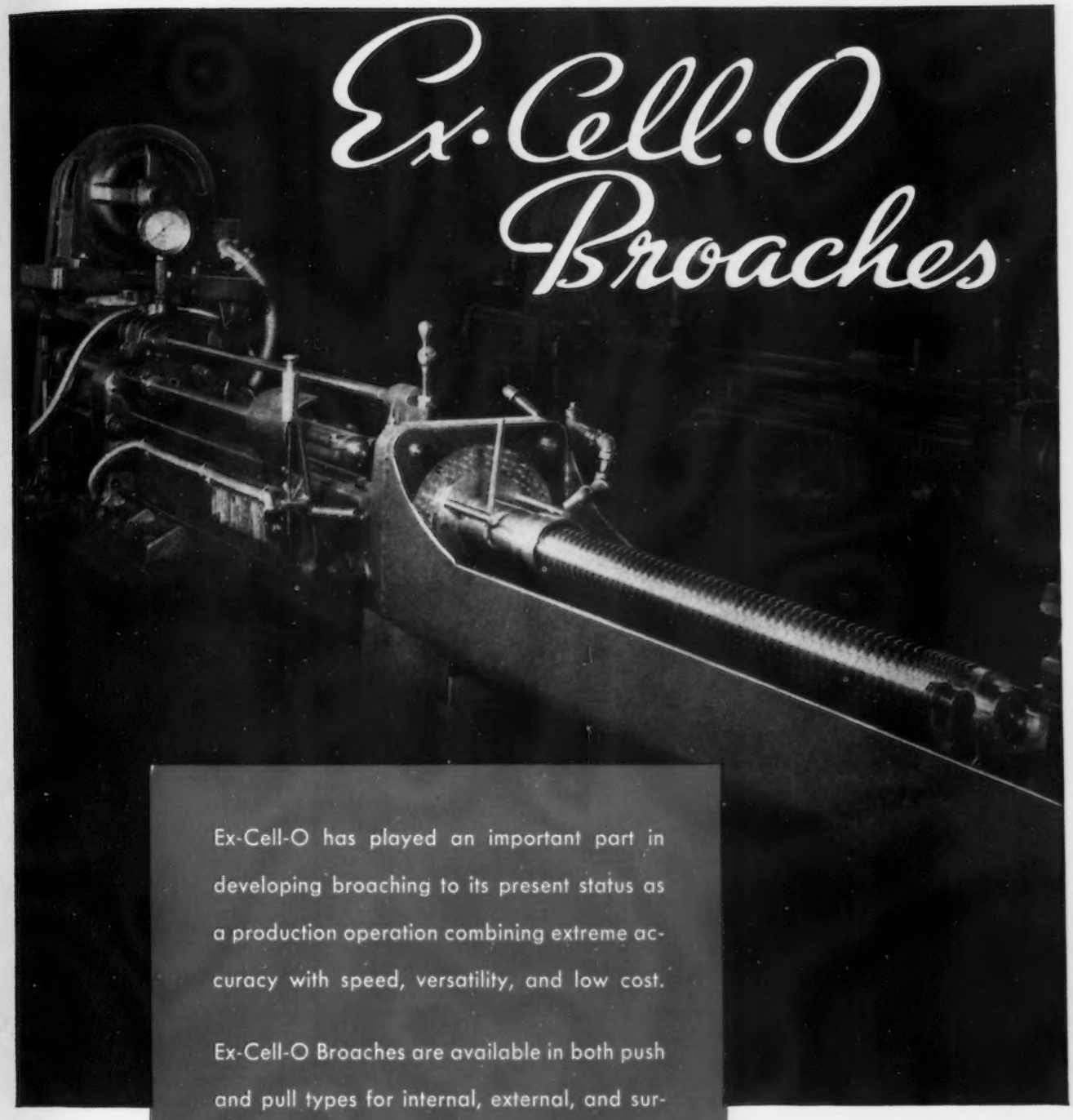
Along with Ford's other activities, tire making is going to become an important factor. Award of a million dollar contract for tire manufacturing machinery will place Ford in a position to provide half his own tire needs. Other developments at the Rouge plant include a huge consolidation program affecting the tool and die shops. Much modernizing of the equipment is in the offing.



ABOVE is shown a portion of the interior of the Roxalin "Trail Blazer" just put into commission by the Roxalin Flexible Lacquer Co., of Elizabeth, N. J. Its purpose is to provide a mobile demonstration of the possibilities of lacquer and synthetic finishes. The trailer is 22 ft. long and the displays include more than 200 parts in various styles, designs and color shades.



INSURING parallelism of two 4 x ⅜ in. broached surfaces on flanges of the rear axle housing, Chevrolet gear and axle division set up two standard Colonial single ram columns on a single wide base. The rams are hydraulically interlocked for simultaneous cutting and return strokes. Chevrolet is providing 20 per cent more axle production capacity by putting up a new engine and axle plant at Buffalo.



Ex-Cell-O has played an important part in developing broaching to its present status as a production operation combining extreme accuracy with speed, versatility, and low cost.

Ex-Cell-O Broaches are available in both push and pull types for internal, external, and surface applications; they are furnished in solid, replaceable section, or combination form.

Complete information covering the widened scope of broaching and advanced design of Ex-Cell-O Broaches will be gladly furnished upon request.

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TRADE MARK

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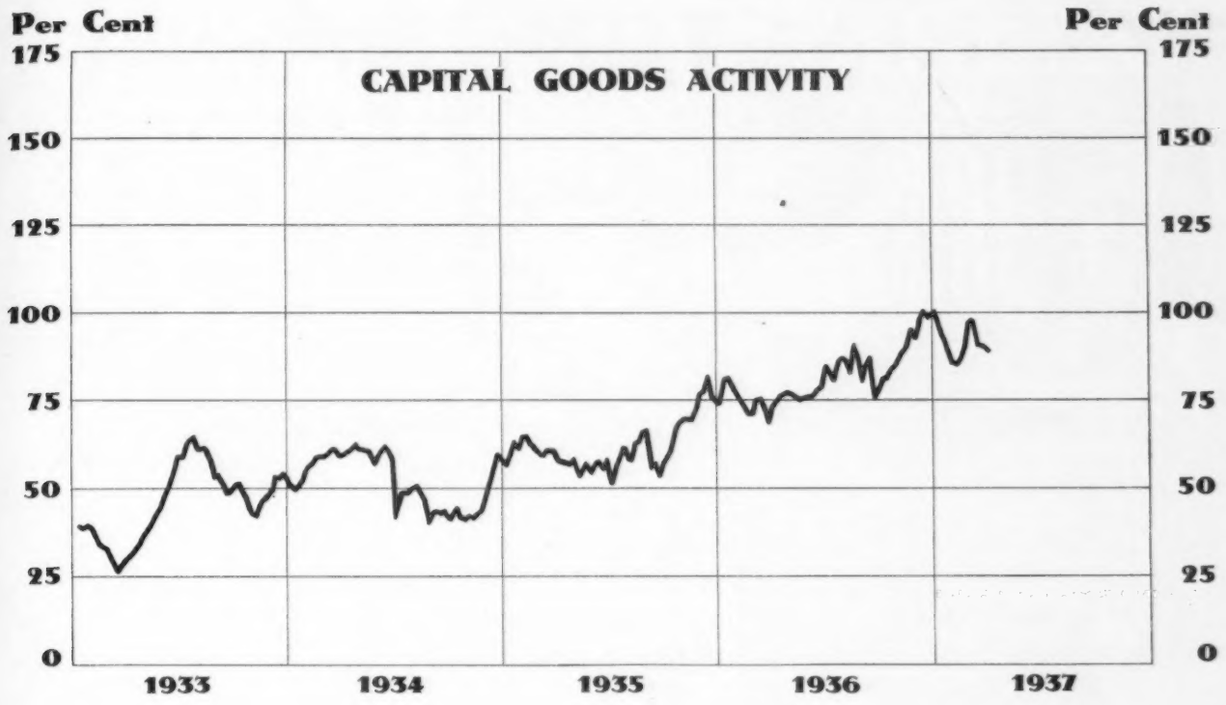
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	February, 1937	January, 1937	February, 1936	Two Months, 1936	Two Months, 1937
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,443,306	4,694,312	2,632,306	5,583,874	9,137,618
Coke production (net tons)[b]	4,283,681	4,629,532	3,293,542	6,743,884	8,913,213
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,999,218	3,211,500	1,823,706	3,849,591	6,210,718
Pig iron output—daily (gross tons)[c]	107,115	103,597	62,886	64,160	105,266
Castings:					
Malleable castings—production (net tons)[d]	57,295	53,638	40,611	88,809	110,933
Malleable castings—orders (net tons)[d]	60,187	54,070	38,278	82,130	114,257
Steel castings—production (net tons)[d]	.....	89,649	47,954	92,252	.....
Steel castings—orders (net tons)[d]	.....	114,939	51,701	110,720	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[c]	4,424,659	4,736,697	2,964,418	6,010,364	9,161,356
Steel ingot production—weekly (gross tons)[c]	1,106,165	1,069,232	716,043	701,326	1,086,756
Steel ingot product—per cent of capacity[c]	84.46	81.64	54.67	53.55	82.97
Finished Steel:					
Trackwork shipments (net tons)[c]	8,153	7,246	4,116	7,482	15,399
Sheet steel sales (net tons)[f]	.....	.....	138,244	313,049	.....
Sheet steel production (net tons)[g]	.....	.....	191,359	414,359	.....
Fabricated shape orders (net tons)[g]	88,946	130,651	140,943	261,307	219,597
Fabricated shape shipments (net tons)[g]	91,848	92,020	78,203	158,198	183,868
Fabricated plate orders (net tons)[d]	30,340	40,424	27,863	66,572	70,764
U. S. Steel Corp. shipments (tons)[h]	1,133,724	1,149,918	676,315	1,397,729	2,283,642
Ohio River steel shipments (net tons)[i]	88,170	96,400	13,782	79,542	184,570
Fabricated Products:					
Automobile production, U. S. and Canada[k]	.....	399,426	300,874	678,180	.....
Construction contracts, 37 Eastern States[l]	$188,590,800	$242,844,000	$140,419,100	$355,211,900	$431,434,800
Steel barrel shipments (number)[d]	.....	919,290	517,424	1,060,021	.....
Steel furniture shipments (dollars)[d]	.....	$2,120,744	$1,484,145	$3,070,591	.....
Steel boiler orders (sq. ft.)[d]	871,746	651,063	810,387	1,433,751	1,522,809
Locomotive orders (number)[m]	33	46	46	60	79
Freight car orders (number)[m]	10,532	10,881	7,236	8,286	21,413
Machine tool index[n]	165.2	200.3	112.1	†107.1	†207.7
Foundry equipment index[o]	249.5	190.9	110.4	†118.5	†241.2
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	43,063	43,358	93,847	.....
Imports of pig iron (gross tons)[p]	.....	12,434	14,660	29,693	.....
Imports of all rolled steel (gross tons)[p]	.....	24,409	18,208	41,166	.....
Total iron and steel exports (gross tons)[p]	290,987	201,692	213,736	455,366	492,679
Exports of all rolled steel (gross tons)[p]	.....	110,139	65,947	145,047	.....
Exports of finished steel (gross tons)[p]	.....	103,495	62,322	136,576	.....
Exports of scrap (gross tons)[p]	143,197	68,884	142,165	296,071	212,081
British Production:					
British pig iron production (gross tons)[r]	603,700	650,700	584,700	1,180,200	1,254,400
British steel ingot production (gross tons)[r]	995,900	998,900	938,500	1,851,000	1,994,800
Non-Ferrous Metals:					
Lead production (net tons)[s]	37,451	43,636	34,127	70,423	81,087
Lead shipments (net tons)[s]	50,375	45,718	33,086	67,676	96,093
Zinc production (net tons)[t]	38,010	40,025	36,228	78,145	78,035
Zinc shipments (net tons)[t]	47,591	50,638	39,918	86,386	98,229
Deliveries of tin (gross tons)[v]	7,675	7,615	5,600	12,235	15,290

† Three months' average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp. [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.



THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	89.2	Same week 1933	30.3
Preceding week	90.3	Same week 1932	37.4
Same week last month	97.8	Same week 1931	74.0
Same week 1936	73.8	Same week 1930	103.7
Same week 1935	57.5	Same week 1929	129.6
Same week 1934	59.8		

BUSINESS took a less promising turn in the durable goods industries last week, as operations fell beneath 90 per cent of normal for the first time in nearly two months. After allowance for usual seasonal changes, the general index of business declined 1.1 points to 89.2 per cent of the 1925-27 average, compared with 97.8 a month ago and 73.8 in the corresponding week a year ago.

The situation was largely influenced by a curtailment in automobile production owing to "sit-down" strikes and a decline in the volume of construction work owing to reduced capital outlay in the face of mounting costs for building materials. As an example of this latter influence, the index of construction costs prepared by the *Engineering News-Record* rose 2.2 per cent between March and April.

There were some continuing favorable symptoms in the week's events, however, perhaps the most conspicuous being the growth in steel production to 91 per cent of capacity, the ninth consecutive weekly expansion in output since this remarkable movement got under way. More cars were loaded with lumber by the railroads during the week than in the preceding period, and industry increased its speed in the important Pittsburgh district.

The actual values used in computing the general index for the week are given below, together with increases or decreases relative to the week before.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	91	+1
Automobile production (number of cars and trucks)	96,710	—4,405
Railroad loadings of forest products (number of cars)	38,173	+786
Pittsburgh industrial production and shipments (index number)	114.3	+1.3
Construction contracts awarded (total value)	$34,678,000	—$14,328,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . *Administration's anxiety over commodity and monetary inflation probably account for President's slap at steel and copper prices.*

° ° °

. . . *Roosevelt believed to have over-emphasized importance of Government spending in present boom in durable goods industries.*

° ° °

. . . *Industrialists willing to see Government spending pared down if that would mean actual saving in total expenditures.*

° ° °

By L. W. MOFFETT

Resident Washington Editor, The Iron Age

° ° °

WASHINGTON, April 6.—The Presidential slap at the steel and other durable goods industries at a press conference last Friday was taken to reflect administration anxiety over both commodity and monetary inflation. It fitted in partially, though not entirely, with broad patterns previously outlined by Governor Marriner Eccles of the Federal Reserve Board and Secretary of the Treasury Morgenthau.

Governor Eccles has said that the monetary policy, with low interest rates, is not responsible for rising commodity prices. Rising prices of steel, cement and copper were particularly singled out by the President as a "danger flag" and apparently have formed the basis for the determination of the Government, according to the President, to shift recovery and relief expenditures from capital goods industries to consumer goods industries. The purpose, it was stated, will be to spread the national income more evenly from the top to the bottom and to halt the rising spiral of prices in steel, cement, copper, etc.

The President did not say anything about monetary inflation or commodity inflation but his remarks implied fear in that direction. But his thought is to reduce activity in durable goods industries insofar as Government spending has anything to do with it. Governor Eccles, on the other hand, in urging a balanced budget, called for increasing production and greater private employment. The President himself has frequently asked private industry to absorb more employment in order to reduce Government relief payrolls. Governor Eccles also has suggested that "increased wages and shorter hours when they limit or actually reduce production are not at this time in the interest of the public in general or in the real interest of the workers themselves."

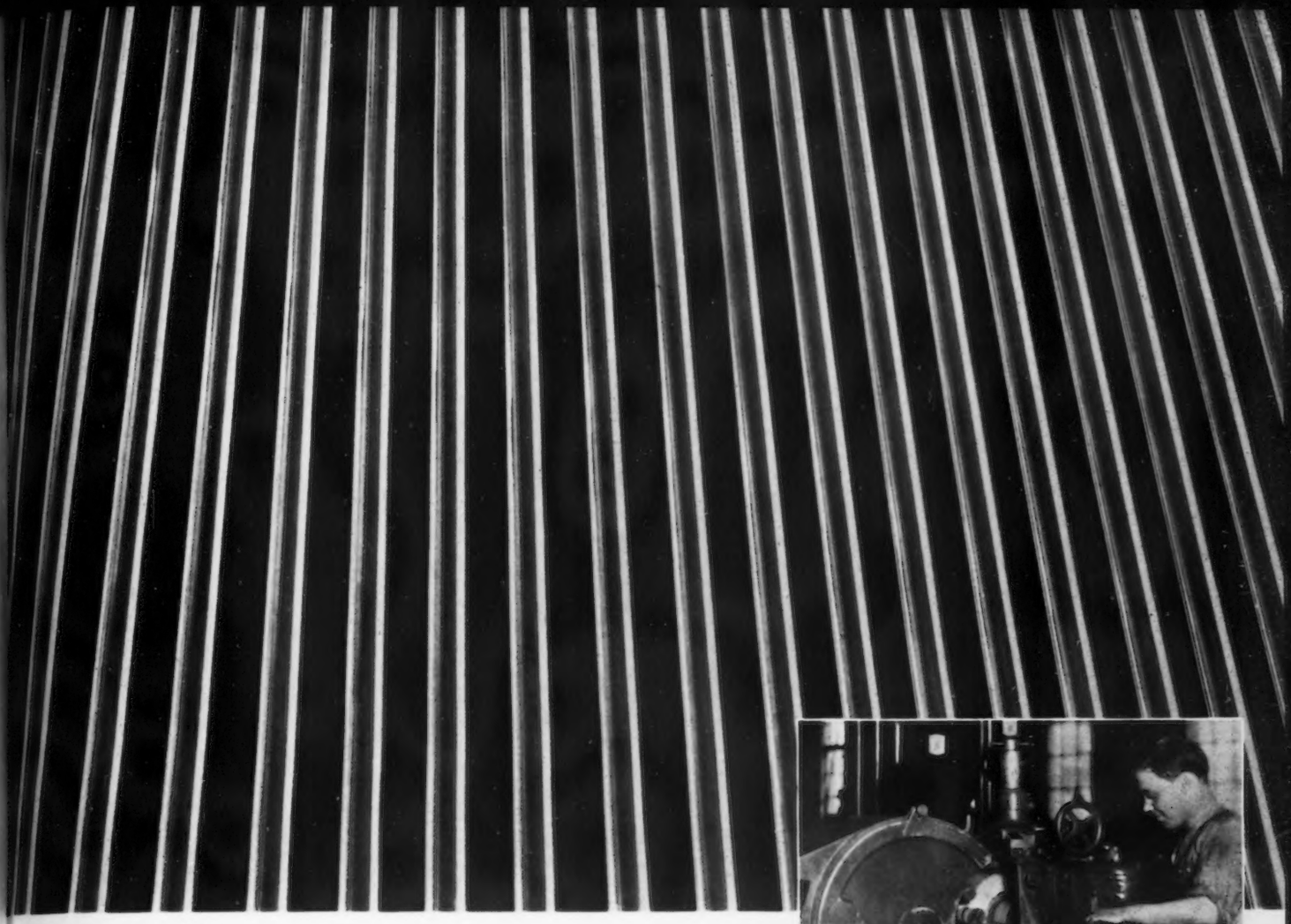
Claims Prices Disproportionate to Wages

The President omitted a like observation. On the contrary he criticized steel and other industries for increasing prices to the point to which they have been increased, claiming that they are disproportionate to wage increases. Steel prices, he declared, have been increased $6 a ton which, to some surprise, he added, represent a rise of two or three times that which labor has received from wage increases. This statement came on the heels of an announcement by the American Iron and Steel Institute that advances in wages and materials aggregate $215,000,000 while prices are up $200,000,000.

Secretary of the Treasury has issued a statement to reassure investors, disturbed over the sharp decline in long-term issues, that the market for securities is orderly. The President's statement brought about a sharp drop in the stock market, though recovery was rather quick.

Commenting on steel prices, the President said that the Central Statistical Board had reported to him that steel is too expensive as compared with wages. This is said to be the view of the Department of Labor. Other Government agencies, it is reported, do not share this opinion but are said to have found about an "even break" between price rises and increased costs, including higher wages and higher costs of raw materials. The President evidently shares the view of the Central Statistical Board and the Department of Labor, though it is said that the Central Statistical Board study of price and wage increases has not been completed.

Regarding copper, the President said many copper companies could operate profitably on a price of 5c. or 6c. a lb. and that others, including the Anaconda Copper Co., could



THE MACHINE

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make money at 8c. or 9c. a lb., while copper is selling at 17c.

Government Purchases of Steel May Be Over-emphasized

There is a common view that the President unconsciously over-emphasized the importance of the Government as a buyer of steel as affecting either production or prices. This, however, is the attitude of certain Government bodies which has long been assumed in an effort to build up their own importance as a stimulant of industrial activity and employment. Especially is this true of the PWA, which at intervals has set forth its expenditures for steel, cement, copper and such basic products. Actually, the PWA expenditures for steel, even in 1935, when the industry averaged 60.2 per cent of capacity, according to THE IRON AGE, were less than 10 per cent of invoiced sales of that year. What Government steel expenditures may be today as related to the total are not definitely known, but they are roughly approximated to be not more than 5 per cent of the total steel purchases and this percentage includes steel for the Navy and other Government national defense branches. The military service purchases, despite impressions to the contrary, are extremely small when measured against total steel production, now averaging above 90 per cent of capacity. So the steel industry would be affected but little if PWA and other "pump priming" agencies of the Government sharply pared their purchases as proposed by the President. Consequently such retrenchment of expenditures for steel would mean little, if anything at all, as to the price structure. Private demand is sufficient to keep that structure up and fortunately to maintain employment. Until costs come down it is not expected prices can be lowered.

Relief Spending to Be Diverted To Other Work

In any event, the President said that instead of construction of steel bridges and huge cement dams and other projects, Government relief spending will be diverted as far as possible to dredging, building of earthenware works and other projects which do not draw on the durable goods industries for materials. Passing by the fact that even this kind of work requires machinery, built of steel, copper, etc., and therefore would to a certain extent draw materials supplied by the durable goods industries, the point has been raised that these operations would not require as much labor as would heavy industries, since the latter represent labor in production and labor in consumption.

There is a question, too, whether the administration plan would not defeat itself if pushed too far by spreading expenditures in consuming lines whose prices already are so high as to bring growing protests from those at the "bottom" to whom it is proposed to give greater benefits. The President said, however, that economic conditions of the past 30 or 40 years show that durable goods price spirals rise faster than consumer goods prices and bring a danger to the country of a slump in consumption of both types of production. Some economists say this is only partially true. They point to the fact that today employment and payrolls in the durable goods industries stand at the index of about 93 compared with the non-durable goods index of 100, using 1923-35 figures as the base, and that price rises in some of the latter have been faster than durable goods price rises.

Some Believe Tax Increases May Come at This Session

Steel and other industrialists who have expressed entire willingness to see Government steel expenditures pared down had hoped the new administration policy would mean a general tapering of Government expenditures. But that is not the prospect and therefore the policy definitely does not look to a reduction in taxes, which themselves are an important factor in high prices of all products. On the contrary, there still is a belief in some Government circles that tax increases may be made at the present

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Solution: J&L Pedestal Comparator

The shell band skiving tool, shown below, presents the complex problem of checking a combination of surfaces and angles in relation to one another. The solution to this problem has been found—it lies in the use of the J&L Comparator.

To check this tool the chart glass on the Comparator is ruled with right angle lines intersecting at the center. One line is perpendicular to the table top when the chart ring is set at zero.

The lateral dimensions, "A", "B", "C", "D", "E", "F", "G", "H", "J", and "T", are measured by setting the shadow of the side of the tool to coincide with the vertical line on the chart glass. The table on which the tool is mounted is stepped over to match the shadow and line for each dimension to be checked. These dimensions are measured with size bars and the built-in micrometer. Any error may be read directly from the micrometer.

Dimensions, "K", "N", "O", and "R", are checked by matching the shadow of the tool to the horizontal line on the chart glass. By raising or lowering the table, the tool is stepped up or down to check each of these dimensions. All vertical dimensions are read directly from the dial indicator on the vertical measuring attachment.

The angles, "L", "M", "P", "Q", and "S", are measured with the vernier segment and the graduated ring around the chart glass. Either the horizontal or vertical line on the glass is turned until it coincides with the shadow of the side of the tool. Any error may be read directly on the vernier in degrees and minutes.

Let us show you the ease with which the J&L Comparator can solve one of *your* complex inspection problems. There is no obligation.

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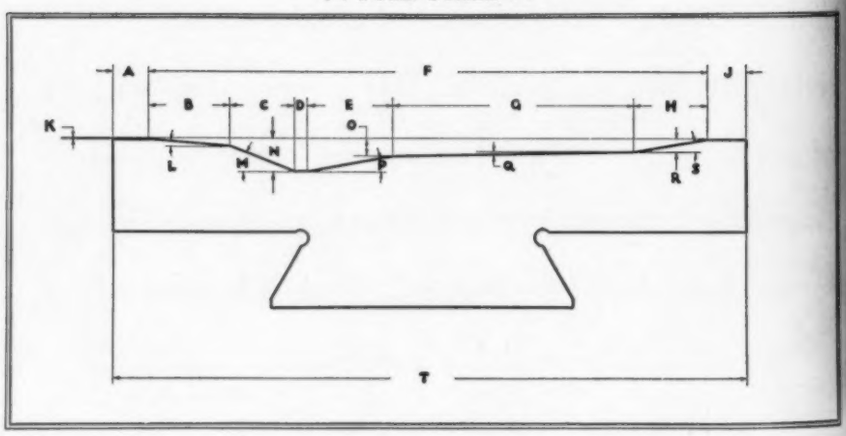


JONES & LAMSON MACHINE

session of Congress, despite attempted assurances to the contrary.

The administration plan to whittle down PWA expenditures—which have gone largely for durable goods—was first made known by Representative Beiter, Democrat of New York. With a group of other Congressmen he called on the President last Thursday and announced that the President favored an extension of PWA for two years with about $150,000,000 annually to spend for construction projects requiring capital goods. The PWA would expire June 30, this year, unless extended.

The President's comment on prices in steel and other heavy industries had led to speculation as to whether he would seek legislation to control prices. The President did not intimate in any way that such an effort was in mind and it is not thought he contemplated or desired such action. But in Congress when the suggestion was brought to attention of members it met with strong objection. Speaker Bankhead of the House of Representatives said he did not see what Congress could do about durable goods prices "except through straight out price fixing, which it won't do, I imagine. It is a difficult question to handle—the question of rise and fall in prices." He added that he was not an economist and had not discussed the situation with the President.

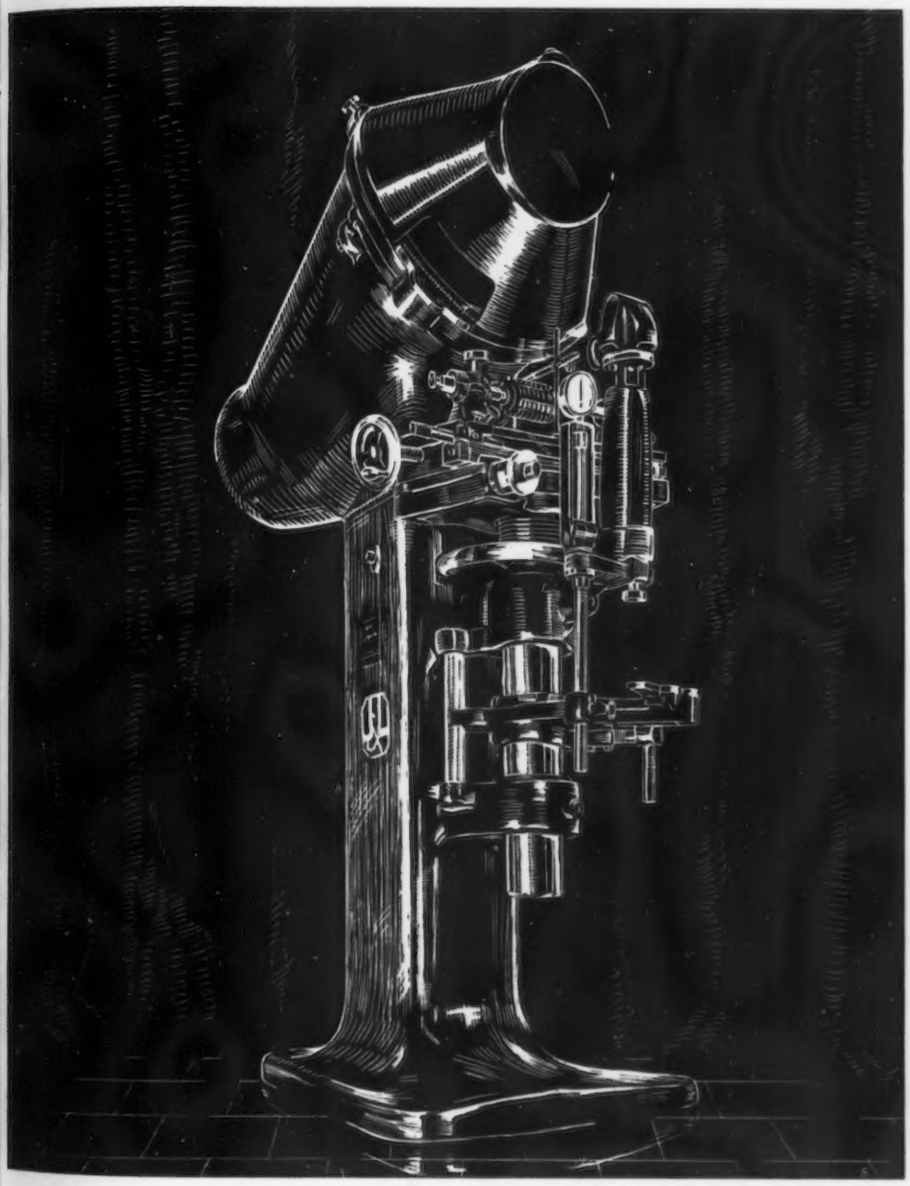
Railroads Say Improved Material Has Lessened Need for Renewals

WASHINGTON, April 6.—Less renewals of railroad track supplies and structures are necessary because of improved material.

This point which vitally affects purchases of steel was emphasized by railroad representatives at a hearing before a subcommittee of the Senate Committee on Interstate Commerce in opposing a bill introduced by Senator Murray of Montana to increase track and bridge maintenance through inspection by the Interstate Commerce Commission. They presented evidence to rebut that submitted by representatives of the Brotherhood of Maintenance of Way Employees and the Association of Railway Labor Executives. The latter maintained that deferred railroad expenditures for track maintenance have decreased railroad maintenance and increased accidents, which were attributed to old and defective track equipment and structures. The railroad witnesses said that on the contrary, accidents have been sharply reduced by reason of careful inspection, use of improved material and better methods of maintenance.

L. E. Keller, Detroit, appearing for the brotherhood, said that Class I railroads have fallen behind in track maintenance expenditures to the extent of $2,425,000,000 in the last six years, based on Interstate Commerce Commission figures showing the average annual maintenance of way and structures during the years 1925 to 1929 to have been $849,021,000. During the five-year period, he said, annual new rail replacements amounted to an average of 2,064,710 gross tons. On this basis, he declared, the deferred rail replacements in the six subsequent years amounted to 7,887,624 tons.

I.C.C. reports, he said, showed that in the five-year period there were 18,658 train accidents, killing 177 persons, injuring 3678 and causing property damage of $20,359,000. Mr. Keller attributed some of these accidents to defective material. In 1935, he stated, when the miles of track had increased to 400,271, an increase of 2.2 per cent over 1925, the number of sectionmen had declined to 99,176 or about



COMPANY, Springfield, Vermont, U. S. A.

50 per cent. The average annual number of hours of all employees in the maintenance of way department in the 1925-1929 period, it was stated, amounted to about 1,000,000,000 hours. During the six subsequent years the deferred man-hours of work were said to be 2,888,000,000. While making tremendous reductions in expenses on maintenance, Mr. Keller said, the railroads have made increases in the speeds of trains that border on the sensational.

Points to Safety Improvements

Carter Fort, general solicitor for the Association of American Railroads, presented figures to show that the railroads have made "most phenomenal improvements with respect to safety conditions of track, bridges and maintenance of tracks and bridges over the last 10 or 15 years" and was supported by other railroad witnesses. They contended that brotherhood witnesses had used comparisons over widely separated years and had not taken into account changed conditions as they apply to present-day methods of maintenance.

Mr. Fort said the Murray bill would not merely give the I.C.C. power to inspect tracks and bridges but would to a large extent take completely away from managements of railroads their control and jurisdiction over bridges and tracks and over the maintenance of bridges and tracks. The bill would require the railroads to file with the I.C.C. rules, standards and instructions for inspection, maintenance and repair of trackage subject to approval by the commission. The commission would be authorized to inspect and test any trackage to determine whether it is in proper condition to be used with adequate safety.

Mr. Fort said the bill would to a large extent put the railroad forces engaged in maintenance and in track and bridge work under the direction and control of the I.C.C., rather than under the direction and control of responsible officers of railroads. He said that commission inspectors might be entirely competent engineers but would lack knowledge railroad engineers have of particular trackage and territory that is necessary to efficient inspection.

Heavier Rail Installed

Mr. Fort said that since 1923 the railroads have spent in improving properties a gross of something like $7,000,000,000 or about $5,000,000,000 net. Of the gross, he said, about $4,000,000,000 went for improvements in tracks and bridges. Heavier rail has been installed and other far-reaching improvements made, he said.

"The whole plant now is a much better plant than it was in 1923 or 1925," Mr. Fort continued. "It therefore costs less and requires less work to maintain it to the same level of excellence now than it did in those years, because now you are maintaining one kind of a plant, whereas in those years you were maintaining a plant which was very inferior to the one that we have now."

He also said maintenance methods have so vastly improved that the same amount of work can now be done much more cheaply and with fewer men than it could be done in the earlier period.

R. B. Ball, assistant general manager of the Gulf Lines of the Santa Fe, pointing out that less renewals are necessary because of

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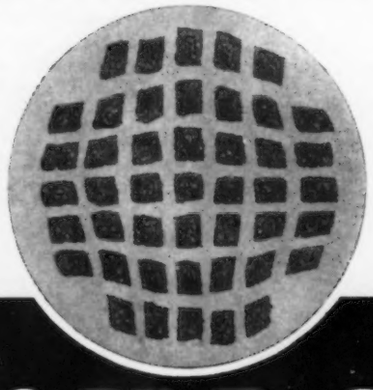

▸ It has ideal properties for Studs,—Header, Follower, Wedge, Foundation, and Crab Mill Bolts.

▸ Exclusive with Milne . . . write for details. There's a distributor near you.

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You'll appreciate them—

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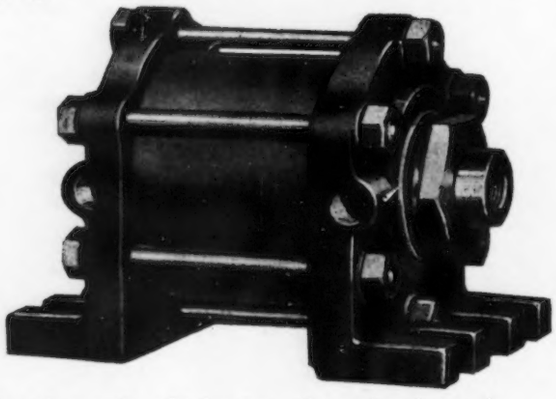
T-J
NON-ROTATING DOUBLE ACTING AIR CYLINDERS



are highly efficient clamping units which respond to the demands of modern production methods without failing. They are available in seven standard styles, all desired capacities, and with stroke lengths to suit your requirements.

May we send you our catalog which gives the specifications of these cylinders?

THE TOMKINS-JOHNSON CO.
628 N. MECHANIC STREET JACKSON, MICH.

Station Type Machines HOLEUNIT Construction

• Illustrated above are two NATCO station type machines built of NATCO HOLEUNITS. The machine at the left is performing a total of 42 drilling, countersinking, rough boring and facing, rough and finish reaming and milling operations on 120 cylinder blocks per hour. Eighty-four operations are performed with each cycle of the machine . . . forty-two operations on each of two blocks every 60 seconds.

• The machine shown at the right is performing 14 drilling, countersinking and tapping operations on each of two blocks . . . a total of twenty-eight operations every 60 seconds and a production rate of 120 blocks per hour is being maintained.

• These machines, two in a "line" of four such machines being used by this motor manufacturer, are built of steel columns and bases. Each machine is provided with a six position automatic indexing table. The first machine is arranged with 7 NATCO HOLEUNITS (5 vertical and 2 horizontal) and the second machine is arranged with four NATCO HOLEUNITS (all mounted in a vertical position).

• It is true these machines were engineered for specific multiple operation jobs . . . yet they are built of HOLEUNITS which are flexible and interchangeable. They are standard in every respect . . . and may be altered and rearranged as required with a minimum of expense.

• NATCO HOLEUNITS are built in a variety of sizes and capacities. Investigate them today. Call, wire or write for a NATCO representative.

Chicago Office, 2009 Engineering Bldg.
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THE NATIONAL AUTOMATIC TOOL COMPANY
Richmond, Indiana, U.S.A.

Reduce Production Costs! Investigate Today

NATCO

Drilling, Boring and Tapping Machines

improved material, said railroads now use heavier rail, and that there is more general use of larger tie plates of heavier thickness and better design. Many ties not previously plated, it was said, are protected and their life increased through installation of tie plates.

"For example," said Mr. Ball, "we would not expect the same renewals under 130-lb. rails fully tie plated in rock-ballasted track as we would expect on that same track with 85-lb. rail, dirt-ballast and without plates."

Heavy Rail 35.6 Per Cent of Total

Mr. Ball declared that from 1923 to 1935 the mileage of 100 lb. and heavier rails increased from 17.1 to 35.6 per cent of the total. In the pre-depression period, 1923 - 1930, inclusive, he said there were 27,535,171 tons of new and second-hand rails laid so that the properties were in excellent shape for a reduction in rail renewal under the lighter traffic through the years of the depression.

"Further," Mr. Ball declared, "rail now lasts longer in track than it did prior to the depression—this, because in the pre-depression period we often renewed rail on the main lines in order to secure second-hand rail for use on branch lines, and further, we have learned how to make rail in track last longer through the building up of rail ends by welding and the replacement of rail joints more frequently."

Rail renewal costs, depending upon the location, weight and other factors on Class I railroads, it was said, average $9,000 per mile.

"Let us assume Federal inspectors should determine that an additional 100 miles of rails should be renewed at an extra cost of $900,000, a renewal which carriers had determined as unnecessary," said Mr. Ball. "It would be impossible for the commission in Washington to know anything of the physical condition of the rail and give a just analysis and we fear that in the end the carriers would have to make the rail renewal. The door is open, therefore, to cause the carriers a great expense because we are dealing with a large mileage and the cost per unit is exceedingly heavy."

Long-and-Short-Haul Bill Reported "Out"

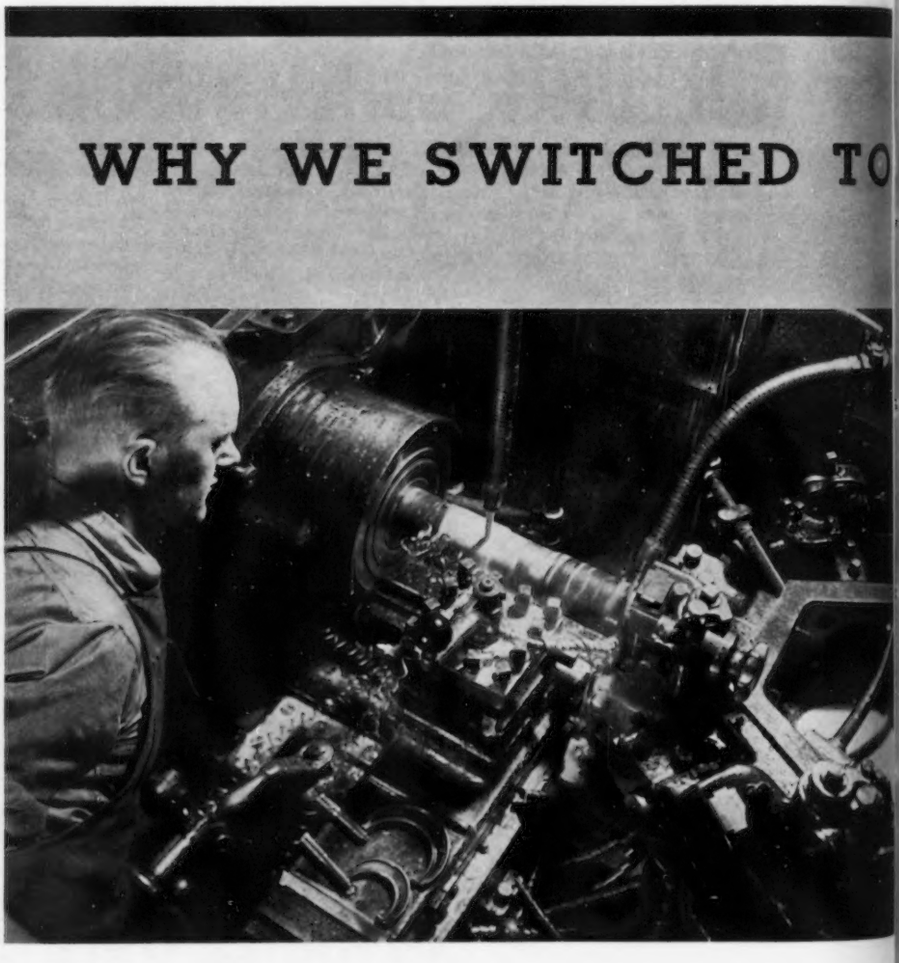
WASHINGTON, April 6.—Favorable report on the Pettengill "long-and-short-haul" bill has been made by the House Committee on Interstate Commerce and it is now on the House calendar. The measure is supported by iron and steel producers generally but is strongly opposed by trucking interests. It passed the House at the last session of Congress but remained in the Senate Committee on Interstate Commerce, whose chairman, Senator Wheeler of Montana, opposes the bill. It is being supported by the ralroads. The bill would repeal the long-and-short-haul clause of the Interstate Commerce Act. The long-and-short-haul provision prohibits the charging of a higher rate to a lesser distant point than to a farther distant point over the same route in the same direction unless authority to do so is first granted by the Interstate Commerce Commission.

Trade Commission Act Amendment on "Deceptive Practices" Passes Senate

WASHINGTON, April 6.—The Senate has passed a bill which would give the Federal Trade Commission control over "deceptive practices." It is an amendment to the Federal Trade Commission Act and would make it unnecessary for the commission to prove competition in cases involving unfair trade practices.

The bill was passed at the previous session but was defeated in the House, where strong objection was made to it on the ground that it greatly increased the snooping powers of the Federal Trade Commission. Recently a sub-committee of the House Committee on Interstate and Foreign Commerce reported a like bill to the full committee with an amendment by Representative Lea, chairman of the committee. The Lea amendment definitely gives authority to the Federal Trade Commission to prohibit false advertising of food, drugs and cosmetics through the injunctive process while proceedings are under way.

The "deceptive practice" amend-



ment long has been urged by the commission. The commission claims there is question now whether it has jurisdiction of a case of deceptive or other unfair practices where it develops that the offender has no competitor but has a monopoly in his field, or that all competitors in the industry are equally guilty. Chairman Edwin L. Davis of the commission has pointed out that however much the public interest may be in need of protection, the commission is powerless to give it. The commission supports its contention by citing the Supreme Court decision in the so-called Raladam case involving deceptive advertising in which the commission has issued its order to cease and desist. The court held that in spite of the finding that the advertising was misleading and dangerous to the public, the Federal Trade Commission had no jurisdiction because it was not shown that the respondent had competitors who were injured by deceptive advertisements. Later, however, the commission said it developed evidence that the concern did have competitors.

Would Expand Commission's Power

Under the present law it is necessary to prove unfair practices that are injurious to competitors. The proposed amendment would greatly expand the commission's power. Any "deceptive practice"— a term that would remain for definition at the hands of the Supreme Court— would be subject to commission action. It could institute proceedings whenever it has to believe that any "person, partnership, or corporation has been or is using any unfair method of competition or unfair or deceptive practice in commerce, and if it shall appear to the commission that a proceeding . . . would be to the interest of the public."

In opposing the legislation the National Association of Manufacturers said that its opinion is that the measure would create an enormous amount of confusion and hardship and will raise serious legal and constitutional questions. The association, in contending that the legislation is not necessary, said it must be apparent that there are extremely few situations in which all the competitors in an industry are engaged in unlawful practices with the result that the commission is deprived of jurisdiction to restrain particular unfair methods of competition.

In the course of his statement submitted to the House Committee in opposition to the bill, President John W. O'Leary of the Machinery and Allied Products Institute, said:

"If amended as proposed in this bill, for all practical purposes as concerns the small businessmen cited as respondents, the commission would be set up as a court with power both of determination and review. The history of the experience of the commission does not warrant any such extension of power on the basis either of competitor interest or public interest. It must be borne in mind that the act pertains to all of business and industry, that respondents cited through a wide range of trades and industries are usually businesses of relatively small size. To require the small businessman to undergo expensive litigation on appeal within 60 days of issuance of cease-and-desist order by the commission is not only to shift an excessive burden to him, but in effect deprives him of his day in court and forces recognition of the commission as the court of last resort. Such an amendment would constitute an encroachment by bureaucracy upon individual rights and serves no needful purpose so far as has been shown."

Warner & Swasey Turret Lathes

"We put one new Warner & Swasey in our production line. Man, Howdy! What we had been doing on a lathe in 60 hours was done on the Warner & Swasey Turret Lathe in 16. Naturally we standardized on these new, fast Warner & Swaseys."

Factory Manager,
Cleveland Punch & Shear Co.

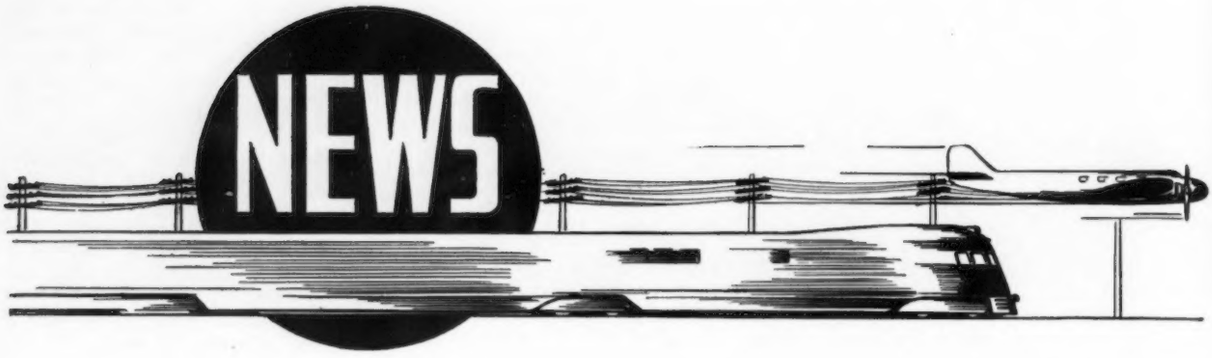
WARNER & SWASEY
Turret Lathes
Cleveland

Industrial Directory Of New England

A REVISED edition of the Directory of New England Manufacturers has been issued by George D. Hall, Inc., 665 Boylston Street, Boston. Published with the editorial cooperation of the New England Council, this is a complete reference book to New England industry, listing 17,000 New England manufacturers, together with the names of the principal officers—president, treasurer, sales manager and purchasing agent. Included is a description of the product made, the number of factory employees, capital and location of plants or branch offices.

A section of the directory contains all products made by New England manufacturers listed alphabetically, together with the names and addresses of the makers. There is also a brand name section.

A new vacation plan for the hourly rated employees of the General Electric Co. has been announced by President Gerard Swope. Under this new plan all employees with one year or more continuous service will get a vacation with pay this year.



Steel Payrolls of $1,055,000,000 Reach New Peak

TOTAL payrolls of steel companies are now at the rate of over $1,055,000,000 a year, the highest level in the history of the industry, according to the American Iron and Steel Institute. This new record rate was reached as a result of the increase of approximately $130,000,000 which became effective March 16. The institute says:

"Costs of manufacturing steel have been increased an additional $85,000,000 a year through the recent rise in price of such raw materials as steel scrap, iron ore, tin and zinc. The rise in labor and material costs, amounting in all to an estimated $215,000,000, on the basis of the amount of finished steel shipped last year, exceeds by almost $15,000,000 the estimated increase in annual gross revenues of $200,000,000 expected to result from the recent advances in steel prices.

"Average hourly earnings of the industry's wage-earning employees, currently at 83½c. per hr. and equivalent to nearly $7 per 8-hr. day are also at the highest figure on record. The minimum wage in the Pittsburgh and Chicago steel districts is 62½c. per hr., or $5 per day of 8 hr.

"Two general pay increases within five months, the first on Nov. 16, 1936, and the second taking effect on March 16 of this year, added $205,000,000 a year to the payrolls of the industry and raised the average hourly earnings of steel wage earners almost 26 per cent.

"The November increase, which lifted annual payrolls about $75,000,000, raised the average wage approximately 10 per cent to about 73c. an hour. Before that increase hourly earnings averaged about 66c. per hour.

The second increase raised hourly wages about 10c. per hr., involving about $130,000,000 annually, and represented a minimum of 19 per cent increase for employees in the lower wage brackets. The increase to all wage earners averaged about 15 per cent. In addition, beginning March 16, time-and-a-half is being paid generally for overtime work beyond 8 hr. per day or 40 hr. per week.

"At current rates, the wages paid to the nearly 548,000 steel employees, amounting to $1,055,000,000 a year, constitute the highest annual steel payroll on record.

"In 1929, the best previous year, the industry paid out a total of $841,000,000 in wages to 458,000 employees, according to the Federal Census of Manufactures. Before that year the record wage total was $825,000,000 paid in 1919 to 469,000 employees, according to the same source. The current level of total wages is more than three times the 1933 total payroll of $318,000,000.

Hourly Earnings Above 1929

"Average hourly earnings of wage earners under the new rates exceed the 1929 average of 65.4c. per hr. by 28 per cent. Before the

NEWS AND MARKET INDEX

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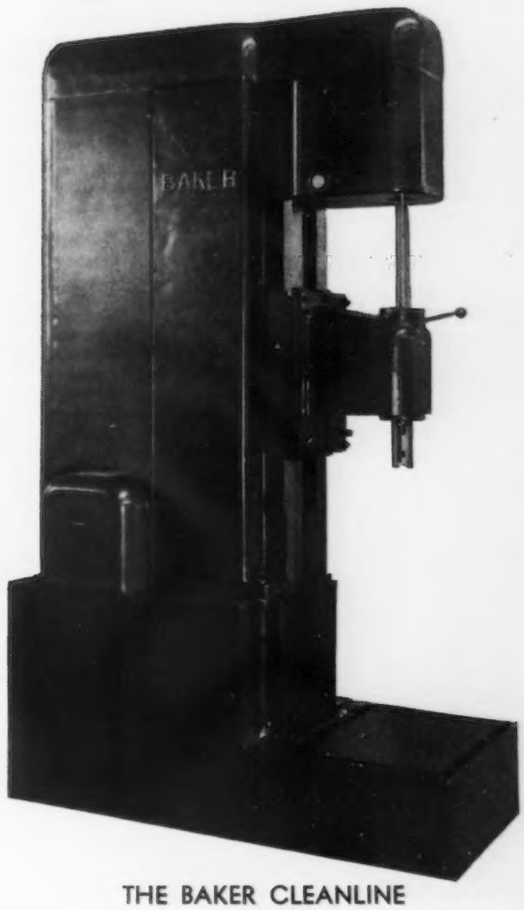
GOOD, YES BUT—

THEY HAVE TO BE BETTER



THE BAKER CLEANLINE
10 HO

Forty years ago Baker made good machines—so good that some are still operating. But those machines can't satisfy the demands of 1937 production; it takes modern equipment to cut the minutes off time and the last fraction of a cent off cost. Today's Baker machines fit today's requirements of high efficiency as well as durability.

Higher wages, shorter hours and higher cost of materials make more efficient equipment the only way to keep down costs.

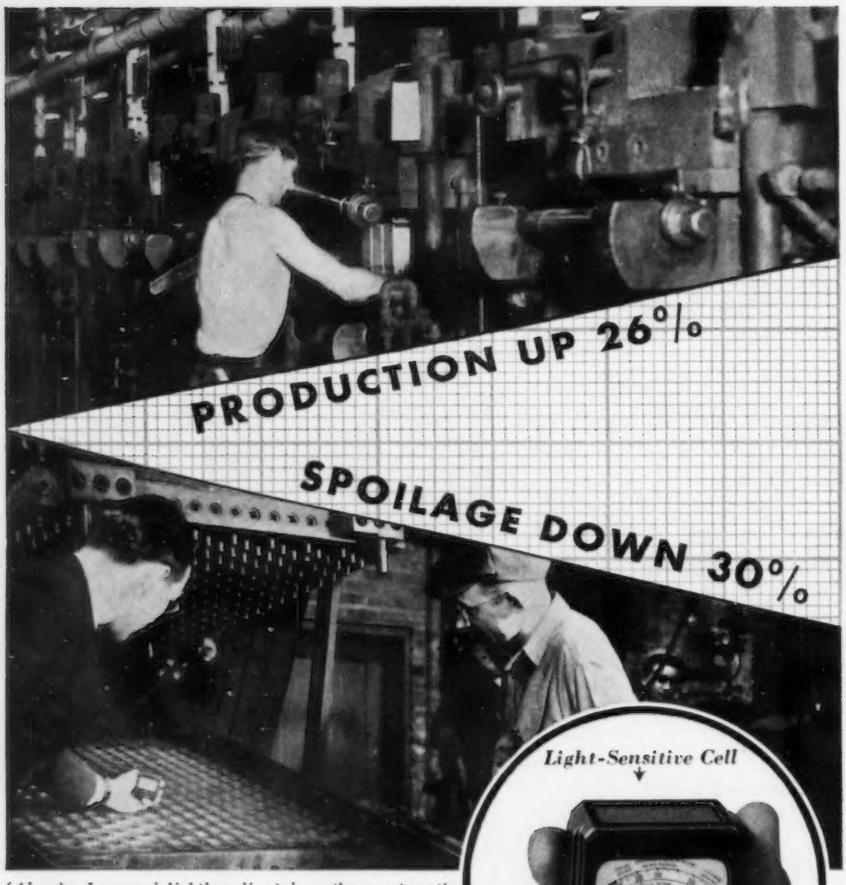
Why are Baker machines outstanding in high production at low costs? Because they are built to performance, not price. If a new alloy proves stronger and better, it goes into our machines. If a new bearing will give longer service, hold alignment longer, our machines are designed with the better bearing. The price of a Baker machine is the price of producing your product faster and at lower cost.

If your operations include drilling, boring, tapping, reaming or keyseating, submit blueprints or sample part. Our engineering department will make a prompt recommendation.

BAKER BROTHERS, INC.,
TOLEDO, OHIO

★BAKER★

(Below)—These machines mold rubber battery cases. Operators must see into the machines to place the charge and again to remove the finished case.



(Above)—Improved lighting directed on these automatic vent presses which turn out battery tops provides between 75 and 100 footcandles for easy, efficient seeing. The Lighting Engineer is checking it with his G-E Light Meter.

• The General Electric Light Meter quickly and accurately tells whether your plant is sufficiently lighted for safe, easy seeing. Costs only $11.50.

BETTER LIGHTING PUTS NIGHT PRODUCTION ON DAY BASIS

A modern lighting installation in the Aetna Rubber Company's Cleveland plant has put night-time production on a daytime basis.

According to Mr. E. J. Malek, general manager of the company, better lighting has helped increase night production so that total production is up more than 26% and at the same time over-all spoilage has decreased 30%. In addition, the factory is much more cheerful and safer to work in than formerly.

Perhaps better lighting can help increase production in your plant. See your local lighting company or nearest General Electric Lamp Division for help in improving your present lighting or in solving specific industrial lighting problems. And write to General Electric Co. Dept. 166, Nela Park, Cleveland, Ohio for a free copy of the illustrated booklet "Special Lighting Applications for Industrial Processes."

THEY STAY BRIGHTER LONGER

GENERAL ELECTRIC

recent wage increase, the previous peak of hourly earnings of steel workers was in 1920 when the average was about 74c. per hr. Current earnings exceed that 1920 peak by almost 13 per cent.

"For a period of years the average number of hours worked weekly by wage earners has been decreasing. In 1936, when the tonnage of steel produced was the third greatest in the history of the industry, wage-earning employees worked an average of only 39.8 hr. per week.

"According to latest information, steel workers were averaging about 41.5 hr. of work per week in the first two months of 1937. At this rate, payment of time-and-a-half for overtime over 40 hr. would increase wages approximately $16,000,000 a year. Pay increases granted to salaried employees in the lower salary brackets, effective March 16, are estimated to have added about $7,000,000 a year to payrolls.

Present indications are that introduction of the basic 40-hr. week will not result in large additions to numbers of men on steel company payrolls, which now show about 76,000 more wage earners than in 1929. In the first place, employees of many companies are reported to have registered protests against any further shortening of hours, and in favor of the longer hours (up to 48 hr. per week) with time-and-a-half pay for overtime over 40 hr. Furthermore, from most districts come reports of shortages of skilled workers required for the jobs involving longer hours.

"Although the current level of steel payrolls is 25 per cent above the 1929 figure, the composite price of finished steel is only 13 per cent above 1929, and still remains 6 per cent below the post-war peak of prices which occurred in 1923. The tonnage of steel produced in the first 10 weeks of 1937 is only a little more than 1 per cent greater than in the corresponding period of 1929."

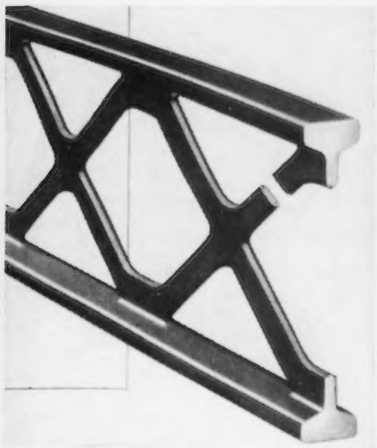
Key Co. To Build Steel Castings Plant

STOCKHOLDERS of Key Co., St. Louis, will be asked to vote on a proposal to raise additional capital to construct a steel castings plant. The plan is to issue 15,000 shares of stock and $300,000 of 5 per cent bonds. The stock is to be offered to stockholders on the basis of one share for every seven held at $10 a share. The bonds would be sold to the public.

J. & L. Markets New Truss Section

A NEW truss section for reinforcement of bridge and other heavy-duty floors is being marketed by Jones & Laughlin Steel Corp. under the trade name "Jaltruss."

A simple one-piece truss with constant physical properties providing uniform reinforcement along both top and bottom of the slab, the



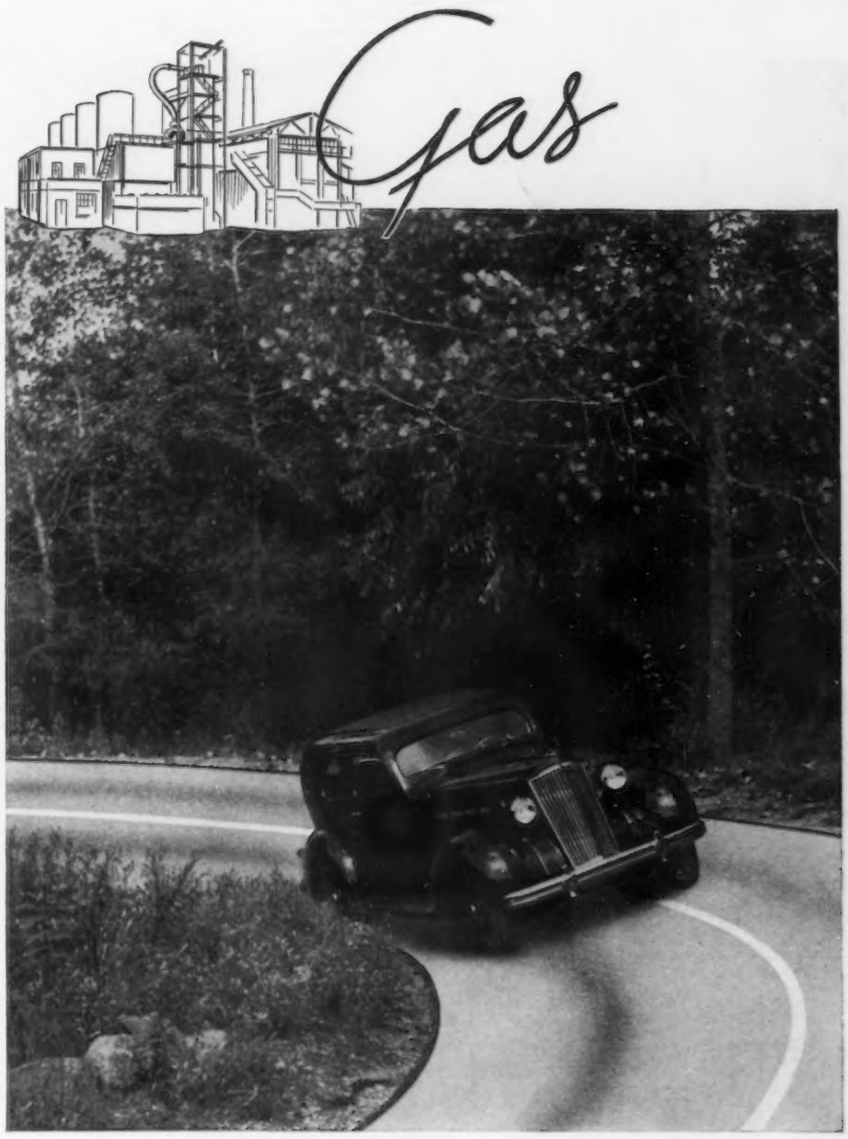
section is hot rolled in one continuous operation from billet to truss at well above the critical temperature. The diagonals and intersections are actually formed during the rolling process.

Use of this new section, according to the company, will result in less time for detail and specification writing and will afford ample opportunity for reduction in construction costs. Light in weight but possessing great strength owing to the section being of a double Warren truss design, it can be placed in position with unusual speed. With no tendency to buckle the truss sections can be placed, alined and leveled in a minimum amount of time, it is claimed.

The product is made in a range of sizes and weights with no restrictions as to length in which it may be used.

Metal Treaters To Visit Eastern Plants

THE Mid-West section of the Metal Treating Institute is planning a good will barnstorming tour of plants in the East during the period May 9 to 18. The trip has as its objectives the enhancing of the institute's prestige, the adding of new members and the collection of information about how various heat treating jobs are carried out in different sections of the country. The visiting group will charter an



COURTESY PACKARD MOTOR CAR COMPANY

. . . and the pick-up of your car

A SMOOTH STRETCH of open road—a traffic light's sudden green wink—and your foot presses the accelerator. You know that the response of your car depends upon the quality of your gasoline—but, you may not know how much the production of good gasoline depends on stainless steel.

The introduction of stainless steel parts in gasoline processing equipment solved a major production problem. Sulphur gases, which attack ordinary metals, once gave gasoline manufacturers "corrosion headaches". Wherever used, Lebanon Circle L Corrosion-Resistant Alloy Steels have proved a practical remedy. Today, fittings, valve and pump parts made of these steels defend profit and product quality.

Make YOUR Discovery: The history of Lebanon Circle L Stainless Steels is a record of discoveries. Industry after industry "discovered" in these alloys the answers to countless problems. New uses for them multiplied. In your own plant, an unsatisfactory condition may exist which could be corrected by use of these steels. Let your engineers and ours "explore and discover".

LEBANON STEEL FOUNDRY · LEBANON, PA.

CIRCLE L *Stainless and Special Alloy Steel Castings*

entire pullman car for the trip, and will live in the car during stopovers in various cities. The car will leave Chicago on May 9, and its itinerary is as follows: Detroit, May 10; Cleveland, May 11; Boston, May 12; Hartford, May 13; Philadelphia, May 14; New York, May 15; Pittsburgh, May 17; and Cincinnati, May 18. For additional information, inquiries should be addressed to Frank Kubosch, 809 West National Avenue, Milwaukee, Wis.

Timken Announces Graphitic Steel

A NEW type of steel, combining the free machining qualities of cast iron with the high strength and response to heat treatment of steel, has been announced by the Timken Roller Bearing Co. This new steel is produced for water hardening uses under the trade mark Graph-sil and for the oil hardening uses under the trade mark Graph-mo. Both grades are suitable for dies used in cold working and shaping steel, brass, Dow metal, aluminum, paper and bronze.

Hannifin Mfg. Co. Buys Allen Plant

HANNIFIN MFG. CO., 621-631 South Kolmar Avenue, Chicago, has purchased the machinery, equipment and name of John F. Allen Co., of New York, maker of air-operated riveting machines. Manufacture, sales and service of Allen riveting machines will be continued as the Allen Riveter Works, Division of Hannifin Mfg. Co., at St. Marys, Ohio. The Hannifin Mfg. Co. has recently completed a new plant at St. Marys, Ohio, equipped for the production of large machinery.

Railroads Spent $273,753,000 for Iron and Steel Products in 1936

WASHINGTON, April 6.—Class I railroads purchased iron and steel products amounting to $273,753,000 in 1936 compared with $156,914,000 in 1935, or an increase of $116,839,000, according to complete reports just released by the Association of American Railroads. The largest financial outlay in the iron and steel group last year was $45,183,000, spent for locomotive and car castings, beams, couplers, frames and car roofs. The purchases of these products in 1935 amounted to $22,054,000. For wheels, axles and tires, the railroads expended $24,501,000 compared with $17,489,000.

Purchases of all supplies in 1936, including fuel, were greater than in any year since 1930, and aggregated $803,421,000 compared with $1,038,000,000 in 1930.

Detailed purchases of iron and steel products follow:

PURCHASES OF IRON AND STEEL PRODUCTS
by Railways of Class I—Calendar Years 1936 and 1935

Item	1936	1935
Steel rail (new and second hand, except scrap)	$37,239,000	$20,576,000
Wheels, axles and tires	24,501,000	17,489,000
Frogs, switches and crossings, and parts of same	8,192,000	5,240,000
Track fastenings, track bolts, spikes, etc.	31,206,000	18,928,000
Iron bridges, turntables and structural steel, all kinds	3,782,000	1,849,000
Bar iron and steel, spring steel, tool steel, unfabricated rolled shapes, wire netting and chain, except light coil; boiler, firebox, tank, and sheet iron and steel, all kinds	24,901,000	11,775,000
Forgings and pressed steel parts for locomotives	3,103,000	1,821,000
Car forgings, iron and steel, and fabricated or shaped steel, for passenger and freight cars	11,072,000	5,224,000
Flues and tubes for locomotives and stationary boilers	5,504,000	3,684,000
Interlocking and signal material	10,310,000	6,378,000
Telegraph, telephone and radio material	2,044,000	1,224,000
Bolts, nuts, washers, rivets, lag screws, pins and studs	10,505,000	6,100,000
Springs, helical and elliptical, all kinds for locomotives and cars	3,228,000	1,987,000
Locomotive and car castings, beams, couplers, frames and car roofs	45,183,000	22,054,000
Track and roadway tools, all kinds, miscellaneous track material and wire fencing. Motor, hand, push and velocipede cars, and parts for same	5,716,000	3,757,000
Machinery and repair parts, including all power driven shop machinery	3,107,000	1,707,000
Machinery, boilers, repair parts and all other iron and steel products	6,550,000	3,433,000
Pipe, iron and steel, and fittings, all kinds	5,519,000	3,512,000
Hardware, all kinds, including nails	3,695,000	2,756,000
Hand and small machine tools, such as drills, taps, reamers, dies, chasers, including air tools and parts	6,483,000	3,505,000
Air brake material	7,425,000	4,709,000
Standard and special mechanical appliances for locomotives	10,573,000	6,477,000
Automotive equipment and supplies	3,915,000	2,729,000
Total iron and steel products	$273,753,000	$156,914,000

STANDARD S.A.E. STEELS IN STOCK

2315, 4615, 3140, 5150, 6145, 4150

Our ***Hy-ten Alloy Steels*** continue to be in growing demand because they allow us to offer you the benefit of metallurgical improvements and developments long before they are incorporated in the S.A.E. standards.

WHEELOCK, LOVEJOY & COMPANY, INC.

CAMBRIDGE CLEVELAND CHICAGO NEWARK DETROIT BUFFALO

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THIS NEW BOOK IS FREE TO EXECUTIVES IN THE IRON AND STEEL INDUSTRY

Here is the latest and most complete showing of modern materials handling systems in the Steel Industry. It is a summary of processing equipment furnished by Mathews during the past eighteen months for America's largest mills.

Over one hundred pages, fully illustrated and written for both Operating and Engineering Executives.

This new book is not just another catalog, but shows how the most advanced Mills are applying the Continuous Flow Principle of Handling Materials, especially in processing departments, to attain maximum output, unite operations, and cut obstinate costs. Executives of the industry are invited to write for a copy, without obligation.

MATHEWS CONVEYER CO., 114 TENTH ST., ELLWOOD CITY, PENNA.

MATHEWS

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS

Steel Companies Form Committee to Work for Scrap Export Licensing

A GROUP of steel companies has formed the Independent Iron and Steel Producers Committee on Scrap to work for the passage of legislation by Congress that will curb exports of iron and steel scrap through a licensing or quota system. Robert W. Wolcott, president of Lukens Steel Co., Coatesville, Pa., is chairman; George Thomas III is treasurer, and Roger L. Wensley, whose office is at 60 East 42nd Street, New York, is executive secretary.

An executive committee representing most of the important industrial centers of the country has been named. In addition to Mr. Wolcott the members are: A. Bindley, purchasing agent Pittsburgh Steel Co., Pittsburgh; G. L. Rathel, director of purchases Continental Steel Corp., Kokomo, Ind.; Clarence Tolan, Jr., vice-president Dodge Steel Co., Tacony, Philadelphia; Peter Rentschler, president Hamilton Foundry & Machine Co., Hamilton, Ohio; H. E. Pape, purchasing agent American Tube & Stamping Division of Stanley Works, Bridgeport, Conn.; Paul W. Miller, vice-president Atlantic Steel Co., Atlanta, Ga.; W. W. MacMillan, general purchasing agent National Malleable & Steel Castings Co., Cleveland; Carlos J. Maas, president Judson Steel Corp., Oakland, Cal.; Charles H. McGrath, general purchasing agent American Brake Shoe & Foundry Co., New York; Paul M. Macklin, Wickwire-Spencer Steel Co., New York; Albert H. Baker, Simmons Co., San Francisco.

The organization was formed at a meeting at the Hotel Barclay, New York, on March 31. A statement given out after the meeting was in part as follows:

"The serious situation which has arisen with respect to the growth in export of iron and steel scrap has recently received considerable publicity.

"The quantity has risen to many times what it has been in any previous year. While this situation is not so serious for the large steel companies who have their own resources it is a very vital concern to the small producers of iron and steel who must purchase their raw materials in the open market.

"Various possibilities as to dealing with the situation were discussed at this meeting, including the setting up of centralized scrap buying. Regional meetings will be held shortly throughout the country, at which small independent iron and steel producers will be invited to participate in a program looking toward some control of the situation.

"It is generally recognized that the tremendous export demand for scrap has seriously dislocated the normal relationship between the price of scrap, pig iron and finished steel. The increase in price of scrap is undoubtedly due in the major part to the re-armament program of foreign nations, with the result that the American public is in effect being forced to pay part of the cost of world re-armament."

Sharon Steel To Get Interest in Mullins

THE trend that has been apparent for some time among manufacturers of flat rolled steel towards the acquisition of or financial interest in consuming plants is indicated in the three-sided deal that is pending among the Sharon Steel Corp., Sharon, Pa.; Mullins Mfg. Co., Salem, Ohio, and the Youngstown Pressed Steel Co., Warren, Ohio.

The Mullins stockholders, who are to vote April 27 on a reorganization plan which provides for the acquisition of the Youngstown Pressed Steel Co., now a wholly-owned subsidiary of the Sharon Steel Corp., will also pass on the proposed increase in the Class B stock of the Mullins Co., to 560,000 shares, of which 200,000 shares are to be transferred to the Sharon company in payment for the Youngstown Pressed Steel Co. plant. This stock transfer will give the Sharon company a 35 per cent stock interest in the Mullins company, which in the proposed set-up will own both its own plant and the Youngstown Pressed Steel plant.

Illustrated literature giving detailed descriptions and specifications on the complete line of LeBlond Heavy Duty Lathes in all sizes—12 inch to 36 inch—will be sent on request. Write for copies today.

Rise in Steel Costs Said to Exceed Revenue Added By New Prices

STEEL manufacturing costs have been increased at the rate of nearly $215,000,000 a year by recent wage advances and soaring prices for many raw materials, according to an estimate by the American Iron and Steel Institute. The statement says:

"The higher costs exceed by almost $15,000,000 the estimated increase in annual gross revenues of $200,000,000 expected to result from the recent advances in steel prices.

"The additional revenues and additional costs are estimated on the basis of finished steel shipments of the industry in 1936, on the quantities of various materials consumed and on the difference between the price of each as of March 15 and the average price in January and February.

"The largest factor in the higher cost of making steel is the general wage increase effective March 16, which is estimated to have increased steel payrolls by $130,000,000 a year.

"Increases in the cost of such raw materials as steel scrap, iron ore, tin and zinc have added $85,000,000 more to annual costs.

"One of the most important factors in the rising cost of raw materials for the steel industry has been the recent sharp advance in scrap prices. On March 15 some grades were reported as selling for $23.75 a ton or over $4 a ton higher than in the first two months of the year, and the composite price of several grades of scrap was about $3 a ton higher. As compared with last autumn, the composite on March 15 was more than $5 a ton higher.

"During 1936 it is estimated that the steel industry purchased about 13,600,000 tons of scrap for use in its blast furnaces and steel-making furnaces. On this basis the more recent increase of $3 per ton will add about $41,000,000 to the industry's annual expenditures for scrap.

"Close to $20,500,000 will be added to the industry's raw material costs through higher iron ore prices, nearly $12,000,000 will be added by the recent rise in the price of tin and approximately $6,000,000 through advanced prices for zinc, used for galvanizing.

"Other raw materials consumed by the steel industry, such as certain ferroalloys, have likewise advanced materially in price within recent weeks increasing by approximately $5,000,000 the annual cost of these products.

"Since 1932 the composite price of finished steel products has increased 33 per cent, which compares with an 180 per cent increase in the composite price of scrap, 200 per cent increase in the price of tin, 160 per cent increase for zinc, 31 per cent for ferro-manganese and 16 per cent for spiegeleisen. Average hourly earnings of wage earners in the steel industry have increased by 57 per cent during the same period."

Cuban Manganese Ore To Be Available Soon

INSTALLATION of new equipment at a cost of $500,000 has been virtually completed by the Cuban-American Manganese Corp. at its plant for the processing of manganese ore near Santiago, Cuba, it was announced in New York by Langbourne M. Williams, Jr., president of the American-owned corporation.

Production at the Cuban plant is expected to introduce a new factor into the world manganese situation, which has been the subject of study by the League of Nations and of important declarations within the last few weeks by the Army and Navy Munitions Board and the Natural Resources Board in Washington, Mr. Williams said.

While officials in Washington were studying the manganese problem, resulting in the listing of the element by the Munitions Board as one of the 23 vitally necessary raw materials in any national emergency, he said, the Cuban-American Manganese Corp., aware of the importance of an adequate, close-to-home supply of manganese, has been speeding completion of its program which will make available to United States steel manufacturers the manganese deposits in Cuba, located only 90 miles off the Florida coast.

Analyzing the condition which has existed, Mr. Williams cited statistics of the United States Bureau of Mines showing that 95 per cent of

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the manganese consumed in this country goes into the production of steel, and records of the Comptroller of the Customs revealing that in 1936, under peace-time conditions, imports of manganese increased 116 per cent over 1935. Of the tonnage imported, 96 per cent was carried from other continents.

"This situation, exposing the virtually complete dependence of American manganese consumers upon the freedom of ocean shipping, which can be restricted or stopped during times of international stress," Mr. Williams said, "is bringing the American steel industry face to face with the danger of manganese shortages, and, to judge from recent dispatches, is causing grave concern in Washington military circles.

"Moreover," he added, "the fact that currently utilized sources of manganese are controlled by distant nations, chiefly Russia, Brazil, India, and the Gold Coast, makes the continuance of these supplies subject to policies suited exclusively to their own ends.

"Attempts of American groups to perfect processes which will permit the utilization of manganese supplies in the United States and Cuba, which could be maintained in crises, have been seriously impeded by the negotiation in 1935 of the reciprocal treaty with Brazil which automatically extended to Russia, and other manganese-producing nations, the same reduced tariff rate on manganese under the most-favored-nation clause.

"Despite this fact," Mr. Williams said, "the intensive research and development work we have had underway for the past year, will now, we believe, make possible the commercial production of high-grade manganese from the Cuban deposits."

He also expressed the opinion that the processes pioneered by the Cuban-American Manganese Corporation over a period of six years may make it possible to increase the production of manganese ore in the United States proper, which now annually supplies less than 1 per cent of the world production.

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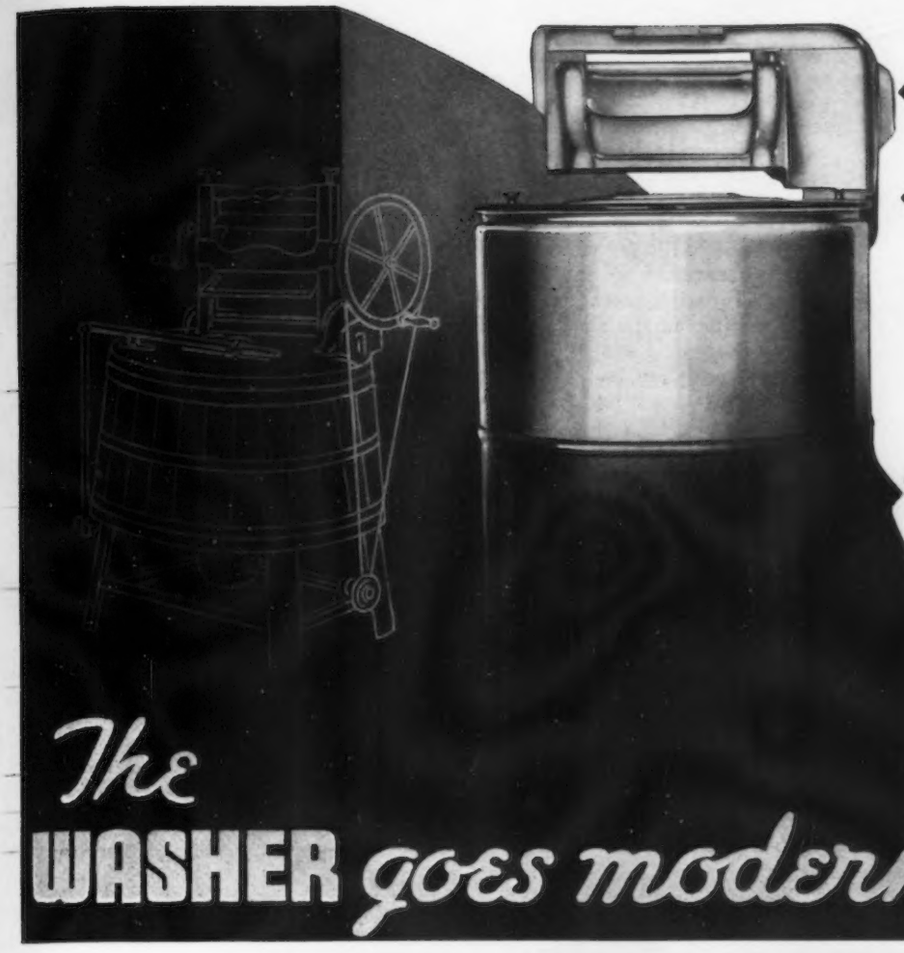
Japan Plans Big Steel Developments

JAPAN'S annual need for steel by 1941 will not be less than 6,200,000 metric tons, and of pig iron 5,900,000 tons, according to the calculations of Admiral Godo, Minister of Commerce and Industry. The current year's needs are 5,000,000 tons of steel and 3,620,000 tons of pig iron.

In the prevailing world steel famine, Admiral Godo has issued a warning to Japanese steelmakers to rationalize the industry and introduce voluntary control of prices; otherwise, he says, the Government will have to take measures for proper distribution of steel.

The Japan Steel Manufacturing Co., controlled by the Government, has acquired 817 acres at Hirohata, 34 miles east of Kobe, on which large additional steel mills, costing approximately $20,000,000, are to be erected. Six 700-ton blast furnaces are to be installed, capable of turning out 700,000 tons of pig iron annually, 500,000 tons of steel ingots, and 400,000 tons of steel plates. These works are to be finished by the fall of 1940.



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. . PERSONALS . .

C. R. BOTTENFIELD, superintendent of the 80-in. and 42-in. mills at the Gary sheet and tin mills of the Carnegie-Illinois Steel Corp., has been transferred to Alabama, where he will become general superintendent of the new tin mill of the Tennessee Coal, Iron & Railroad Co. He will be succeeded by L. S. DAHL, who has served as superintendent of the cold reduction and annealing departments. HARRY GUDE, assistant superintendent of cold reduction, will take over Mr. Dahl's title and duties, and will be succeeded by A. L. BILLETER, who has been assistant superintendent in charge of annealing at the sheet and tin mills. ROSS O. LAUB will become the new assistant superintendent in charge of annealing.

Mr. Bottenfield went to the Gary sheet and tin mills on June 1, 1919. Previously he had taught school at Milltown, Ind., and had served in the United States Army as second lieutenant of artillery during the War. Beginning as a mechanic's helper in the machine shop of the tin mill, Mr. Bottenfield served successively as scrap press mechanic, tin house shop machinist, machine

C. R. BOTTENFIELD

shop foreman, master mechanic, master mechanic of the roughing mill, and night superintendent of the 42-in. hot strip mill. Later he became day superintendent of this hot strip mill and was promoted to the position of assistant superintendent in charge of hot and cold rolling. After a period as assistant manager in charge of hot and cold rolling, he became superintendent of the cold reduction department.

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HORACE S. VAILE, since 1932 assistant to vice-president, United States Steel Corp., New York, has

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been appointed comptroller of Marshall Field & Co., Chicago, effective April 5. He has been identified since 1928 with U. S. Steel, where he established and developed its sales research, sales promotion and advertising department. He took an active part in general policies and organization activities and formulated and carried on certain budgetary control activities. Mr. Vaile was graduated from Purdue University in electrical engineering in 1920 and received a master's degree five years later. Prior to that time he had served in France during the World War. From 1920 to 1928 he was identified with the McGraw-Hill Publishing Co., in Chicago, principally as industrial marketing counsellor.

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E. S. HARMAN has been appointed superintendent of the rail mill at the Gary works of Carnegie-Illinois Steel Corp. He is a graduate of Armour Institute with a degree in mechanical engineering,

E. S. HARMAN

class of 1915. While attending school he worked as a first helper on an open-hearth furnace. Previous to joining Carnegie-Illinois he gained steel industry experience as an assistant to master mechanic, assistant to chief engineer, steam engineer and superintendent of steam power. From 1924 to 1923 he headed his own business as consulting engineer and construction engineer. Mr. Hartman went to South Works of Carnegie-Illinois in 1935 as a fuel engineer. In 1936 he was appointed to the position of assistant division superintendent of rolling at South Works.

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VINCENT P. RUMELY, until recently divisional superintendent of the Hudson Motor Car Co., Detroit, is now a manufacturing executive of the Crane Co., Chicago. Mr. Rumely has been active in the automotive industry for a number of years and remains as chairman of the Detroit section, Society of Automotive Engineers, until the end of his term this June.

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HENRY E. REA has been appointed manager and HARRY KRAELING, vice-president, of the Pittsburgh Gear & Machine Co.

P. H. STAERK, who has specialized for the past several years in the sale of bearings for power transmission equipment for the Ahlberg Bearing Co., Chicago, has been appointed manager of the industrial division in charge of distributor and production sales of mounted bearings. He has been identified with the company since 1920.

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HARRY C. FRANZHEIM has been made district manager of sales at

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Seattle for the Wheeling Steel Corp., Wheeling, W. Va., succeeding LYMAN T. BANKS, who has resigned. Mr. Franzheim has been Seattle assistant manager for the past two years and was previously located at Wheeling.

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T. M. SINCLAIR has become purchasing agent for the Line Material Co., South Milwaukee, Wis.

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A. A. PEDERSON, formerly sales manager for the United Iron Works, and S. O. OTRICH, of the former S. O. Otrich Co., San Francisco, have organized the Transmission Engineering Co., in the same city, to serve as a manufacturer's agency. The company represents the Stearns Magnetic Mfg. Co., Milwaukee.

C. J. DUBY, for the past six years chief engineer of the Warren district of the Republic Steel Corp., has been appointed chief engineer of the Youngstown-Warren district following a general organization plan recently adopted under which the Youngstown and Warren mills of Republic were combined into one operating district. E. H. KOENIG, formerly chief engineer of the Youngstown district, has resigned.

A native of Scranton, Pa., Mr. Duby's first position in his chosen line of activities was as a field engineer for the Eastern Steel Co. in Pottstown, Pa., In 1917 he went with the Republic Iron & Steel Co. as mechanical engineer in the engineering department. In 1922 he was made manager of the Youngstown fabricating plant and later became chief draftsman of the

C. J. DUBY

Trumbull Steel Co. at Warren. He was appointed assistant chief engineer in 1929 and in 1931, after the Republic merger, was made chief engineer of the Warren district.

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ROLAND W. BURT has been appointed Eastern manager of railroad sales for Joseph T. Ryerson & Son, Inc., with headquarters at the Jersey City office. He has been with the Ryerson company for 14

ROLAND W. BURT

years, advancing through the company's various sales divisions. He was formerly representative in Indiana and later was in charge of railroad sales at St. Louis.

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HENRY P. GEORGE, a graduate of Lehigh University in 1935 and a research fellow in the department of metallurgy and metals research laboratory at the Carnegie Institute of Technology, has received a Charles A. Coffin Fellowship from the General Electric Co. He will

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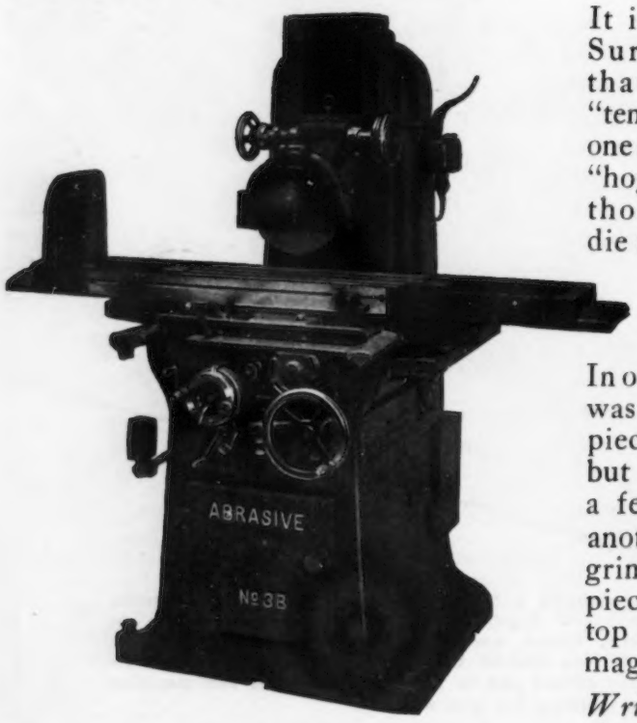

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FRANK H. ADAMS, vice-president and general manager of the Surface Combustion Corp., Toledo, was the guest of honor on March 29 at a dinner given by his associates celebrating his 25th anniversary with the Henry L. Doherty organization.

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JOHN H. OREM, JR., celebrated the anniversary of 50 years of continuous service with the Carey Machinery & Supply Co., Baltimore.

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FRANK MOONEY has been appointed superintendent of the No. 2 open-hearth plant, Carnegie-Illinois Steel Corp., Gary, Ind. He is a graduate of the University of Minnesota and was first employed by the corporation in 1924. In March, 1936, he was made assistant superintendent of the Bessemer and No. 3 open-hearth plants at South Works.

...OBITUARY...

WILLIAM H. MILLER, manager of the agency sales department of Pratt & Whitney, Division Niles-Bement-Pond Co., and associated with Pratt & Whitney for 47 years, died of heart disease on March 26 in Unionville, Conn., aged 67 years. Born in Liverpool, England, Mr. Miller came to this country when he was 12 years old. He entered the employ of Pratt & Whitney on June 30, 1890, as an apprentice. For some years he was in the engineering department, where he had a number of designs to his credit. He was later made manager of the foreign sales department and subsequently sales manager for the entire company. He had been manager of the agency sales department for the past three years. His wide knowledge of men and affairs in the machine tool world made him almost a historian for the industry, and his collection of many records of important events and unique happenings will become invaluable.

W. H. MILLER

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FRANCIS FLEURY PRENTISS, prominent Cleveland industrialist, civic leader and philanthropist, and chairman of the board of the Cleveland Twist Drill Co., of which he was one of the founders, died at Pasadena, Cal., April 1, aged 78 years. His death resulted from pneumonia following an operation. Mr. Prentiss was born in Montpelier, Vt., and in his boyhood days moved with his parents to Winona, Minn. After finishing school he was employed for three years as a bank clerk and then went to Cleveland, where he became engaged in the business of manufacturing locks under the firm name of Davies & Prentiss. In 1880 he and the late J. D. Cox formed the firm of Cox & Prentiss, which later became the Cleveland Twist Drill Co. The factory at the time employed 10 men besides the two partners, Mr. Prentiss having been the superintendent. He served as vice-president, presi-

dent and general manager of the Cleveland Twist Drill Co. and was elected chairman of the board when he became less active in business affairs. He had numerous business affiliations in Cleveland with banks and industrial companies as a stockholder and director.

For a long period Mr. Prentiss had taken a very active part in various welfare, educational, art and music activities in Cleveland, to which in recent years he had devoted most of his time. Achieving remarkable success as a business man, he acquired a large fortune and was one of the city's most generous contributors to charitable and other activities which he fostered. He served for years until his death as president of St. Luke's Hospital, Cleveland, to which he made large contributions. He was a trustee of both Western Reserve University and Case School of Applied Science, Cleveland, vice-president of Cleveland Museum of Art, trustee of the Western Reserve Historical Society and had served as president of the Cleveland Chamber of Commerce

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T. V. BLODGETT, since 1925 sales manager of the Lebanon Steel Foundry, Lebanon, Pa., died from complications following an operation at a hospital in that city on March 28, aged 47 years. He received his technical training at Lehigh University. For a time he was in charge of the drafting room at the plant of the Bethlehem Steel Co. and left the company in 1920 to become associated with the Lebanon Steel Foundry. He served as chief inspector and sales engineer until 1925, when he was made sales manager. He was an active member of the Lehigh Chapter of the American Society for Metals and of the Alloy Casting Association.

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GRANT C. DEETER, purchasing agent for the Speer Carbon Co. and its affiliate, the International Graphite & Electrode Corp., St. Marys, Pa., died suddenly at his home in that city on March 15.

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FREDERICK C. LANGENBERG, vice-president in charge of research of the United States Pipe & Foundry Co., East Burlington, N. J., died of a cerebral hemorrhage at his home in Edgewater Park, N. J., on April 4, aged 47 years. Doctor Langenberg was graduated from Ohio State University and Harvard and subsequently became a teacher of metallurgy at the latter institution. He abandoned teaching in 1915 to become a metallurgist at the Watertown Arsenal, and later was made director of the testing laboratory. In 1926 he became associated with the Climax Molybdenum Co., New York, and left three years later to take charge of research at the Burlington plant of the pipe company. Doctor Langenberg was active in technical associations and was the recipient of many awards by engineering societies for achievements in metallurgy, among them being the Henry Marion Howe gold medal in 1926 by the American Society for Metals.

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Test this WELDING TORCH ★ Free ★ FOR TWO WEEKS IN YOUR PLANT

Allegheny Installing Electric Furnace

ALLEGHENY STEEL CO. has commenced the installation at its Brackenridge, Pa., plant of an additional 25-ton electric melting furnace for the production of specialty steels. It will add 3000 tons a month to Allegheny's capacity.

The project, which involves a cost of $150,000, the hiring of approximately 200 men and the relocation of a brick laboratory building to make room for the necessary plant extension, was made necessary by the increasing volume of business.

Completion of a new communications center at the Brackenridge plant was also announced. All plant inter-communicating lines, telephone and telegraph connections, and a teletype system which links the company's 13 district offices are centered in the new building.

Inland Steel's Sales in 1936 a Record

INLAND STEEL CO. reports 1936 sales at an all-time high level. Income last year was $12,800,545 or $8.54 a share. Net income in 1935 was $9,417,881, or $6.54 a share. Net sales last year reached $98,903,896, against $62,544,872 in 1935. Gross sales in 1936 bettered the 1929 gross by more than $30,000,000.

Wisconsin State Bureau of Purchases, Madison, Wis., has accepted bid of Inland Steel Co. for furnishing 400 tons of steel sheets for motor vehicle license plates to be fabricated at State Prison, Waupun, Wis.

Scrap Export Bill Has Been Referred to Government Departments

WASHINGTON, April 6.—For the purpose of getting their views on his proposed legislation, Senator Schwellenbach, of Washington, has referred his bill to license scrap exports to interested Government departments and asked them to make reports on it. It is understood that reports have been asked of the State, Commerce and War Departments. The reports are not expected to be completed before the end of the present week, if that soon.

Meanwhile, the proposed legislation has stimulated a remarkably intensified interest in the subject of iron and steel scrap exports. Both the daily press and magazines are devoting or are preparing to devote much space to the subject. The outstanding feature of the publicity is to fasten the movement to rearmament programs abroad, with the rise in price treated as a secondary point.

The proposed legislation is also the object of discussion with members of Congress by both mail and personal calls and of literature issued by peace societies. Members of Congress say communications and personal callers reflect divided views as to the desirability of the legislation. Those of the general public, rather than those directly concerned, who are urging the legislation, were said to do so on the contention that the material is being used to build up armament programs and is therefore a threat to world peace. The non-technical view of opponents was said to be that if a precedent is set up to limit exports of scrap, it may easily be extended to any other product, steel, cotton, textiles, food and whatnot, inasmuch as any sort of human needs in reality are war needs. Administration leaders, it is reported, oppose the legislation.

The tin plate scrap licensing act, which was sponsored and passed without administration participation, was used as the model in drafting the Schwellenbach bill. The wording of the Schwellenbach bill is identical to the tin plate scrap act, except that the word "tin" has been eliminated and the word "steel" substituted in its place. Hence the Schwellenbach bill is too limited in scope to satisfy those steel producers and foundry interests who are urging licensing legislation. If it is pressed for passage the bill, therefore, probably will be broadened to include all iron and steel scrap and not merely "steel-plate" scrap as now provided. It is assumed it would also omit reference to the "dependent position of the United States with respect to resources of scrap steel." This phrase in the tin plate scrap act appropriately referred to the lack of domestic tin supplies, while manifestly the United States is by far the world's largest source of steel scrap supplies.

Scrap dealers who are strongly opposing the licensing legislation insist that there is no scarcity of supplies of scrap and that the price level is due to the same law of supply and demand that has increased prices of steel. Steelmakers who favor the bill, on the other hand, maintain that the rising prices of steel are due to an important degree to the high scrap prices and that the latter have been boosted by relatively heavy exportations.

International Steel Congress Postponed

OWING to the extreme pressure of business, combined with the emergency work which is being undertaken in Europe, the Sixth International Congress for Steel Development, which had been scheduled to meet in New York the last week of June, 1937, has been cancelled. This step was taken at the request of the steel industries abroad.

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You'll find it makes a big difference when you have a real metal cutting job to do. The combination of long-wearing Molybdenum and the special Starrett heat-treating process makes a blade that will stand up longer and cut fast even through tough metals like nickel, monel, stainless steel, high speed steel, tool steel, phosphor bronze, etc. Order a trial supply from your distributor. Write for the revised Starrett Catalog No. 25 AA.

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Steel Tapes, Standard for Accuracy
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Use Starrett Hacksaws

American Steel Employees Earned 140% Above Average Foreign Wage

AMERICAN steel workers received an average of 67c. an hr. in their pay envelopes last year compared with an average of only 28c. an hr. for steel workers in eight foreign steel producing countries for substantially the same period, the American Iron and Steel Institute has calculated.

The figures used were chiefly data from the International Labor Office. The calculation was made by translating the hourly pay of foreign steel workers into American money at the rate of exchange prevailing when these pay schedules were in effect.

After the 10 per cent increase last November in the wage rates paid in this country, wage-earning employees earned an average of 73c. an hour, or 160 per cent more than the average for foreign steel mill employees. The further increase effective March 16 is estimated to have raised hourly earnings of American steel workers to 83.5c., or nearly 200 per cent above the foreign average.

American Steel workers earned from 81 per cent to 740 per cent more per hour than steel workers in the eight individual foreign countries last year. After the wage increase effected here in March, hourly earnings ran from 125 per cent to 950 per cent above the earnings of steel workers in foreign countries.

These figures do not take into consideration the longer work week in foreign plants, which brought total weekly wages to a level slightly closer to that of American workers. The figures also have not been adjusted for any changes which may have occurred in the hourly earnings of foreign steel workers since the period covered by the available data, generally either the last quarter of 1935 or some period of 1936.

Translated into American money the earnings per hour of foreign steel workers ranged from 8c. for Japanese employees to 37c. for French employees, with the French franc computed at the rate of exchange prevailing before its devaluation last year. Comparative earnings of French workers would have been shown materially lower if their wages had been translated into dollars at the current rate of exchange.

Steel workers in Great Britain received the second highest hourly wages in the list of foreign groups, with an average of 34½c., German and Swedish workers each received an average of 29c. an hr.; Polish, 22½c.; Italian, 21c., and Belgian, 16c.

During 1936 American steel workers were receiving an average of 39c. an hr. more than the average earnings of steel workers in these eight foreign countries. After the wage rise, effective March 16, 1937, the difference in favor of the American worker was 55c. an hour.

Brammer Machine & Tool Service Co., Tulsa, Okla., has been appointed the exclusive representative of the Murchey Machine & Tool Co., Detroit, in the Oklahoma territory.

Straight Cuts, Angle Cuts, Notching Coping, Mitering . . .

THE MARVEL No. 8 is the truly universal metal cutting saw, handling all work from ⅛" x ⅛" to 18" x 18". It is one of the most versatile multi-purpose saws built.

With its planer-type bed, hand and power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left, it gets in on every job to save labor and costly hours or to improve shop practice. It will save "warehouse cutting extras" on die plates. It will save hours of machining in roughing to form and shape. It will miter, notch, and cut off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. You will see them everywhere, and wherever you see one, it's the busiest machine in the shop.

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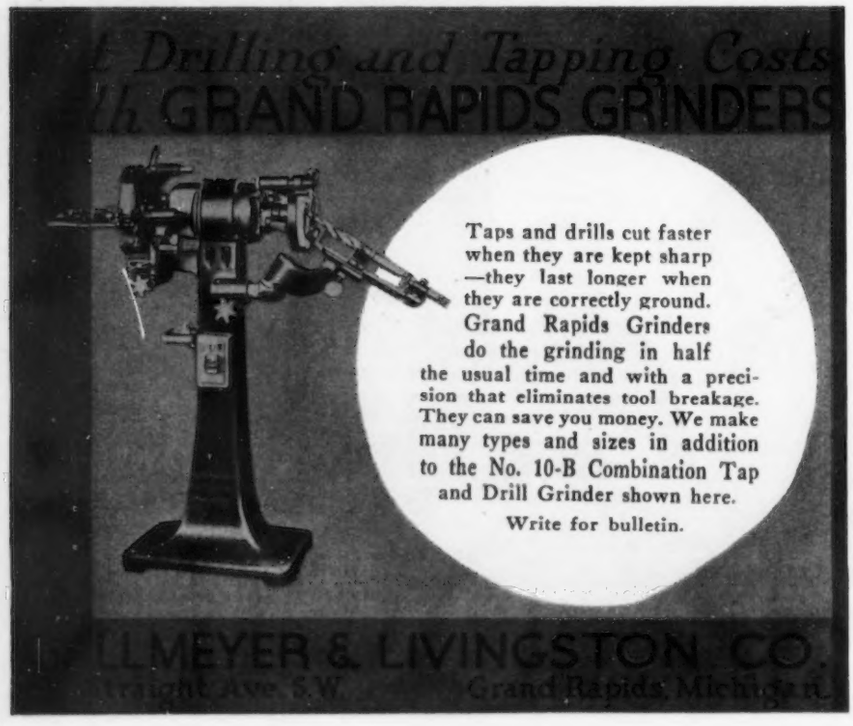
"The Hack Saw People"
349 N. Francisco Ave., Chicago, U. S. A.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h GRAND RAPIDS GRINDERS
Taps and drills cut faster when they are kept sharp —they last longer when they are correctly ground. Grand Rapids Grinders do the grinding in half the usual time and with a precision that eliminates tool breakage. They can save you money. We make many types and sizes in addition to the No. 10-B Combination Tap and Drill Grinder shown here.
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Monopolies in Business or Government Destroy Freedom, Says T. M. Girdler

MONOPOLIES, whether organized by business men or by government, destroy competition and therefore, destroy freedom, T. M. Girdler, chairman and president of Republic Steel Corp. told radio listeners April 1 over Station WGAR, Cleveland. The talk was one of a series of broadcasts sponsored by the Adult Education Association of Cleveland on the subject, "What I Would Do to Maintain Democracy."

Mr. Girdler pointed out that dictatorships exist in Germany and Italy because in those countries they have stifled not only freedom of the individual but also freedom of competition between individuals and between businesses.

"Wherever the free play of individual action and the free play of competition between individuals and between businesses has been stifled by monopoly or bureaucracy, democracy has been smothered; men have been afraid to develop ideas and therefore new processes and commodities; businesses have been unable to compete; and the standard of living of the people has gone downhill. Fascism, Communism, Nazism have produced a receding standard of living along with a repression of human rights.

"The inevitable conclusion, therefore, to be drawn from facts which history has shown us, is that any forces or agencies which tend to enforce upon a free people an arbitrary control of their actions —even under the excuse of 'working for the good of the people'— constitute a threat to democracy, limit equality of opportunity hamstring progress and lower the standard of living.

"We witness in this country today various special groups seeking to force arbitrary governmental control over the actions of other people by means of specialized legislation. These groups and their activities constitute a threat to the American system of living —a threat to the freedom of action of the individual, and a threat to the interplay of free competition, under which the people of this country have lived for the past 150 years, and under which they have achieved the greatest degree of prosperity and the highest standard of living which any people in the entire history of the world have ever enjoyed.

"I want to make is clear to you that I am not opposed to change. The industry with which I am associated has ever been in the forefront of change. We have changed our methods of production; we have changed the character of commodities which we produce. Just as we welcome changes when our engineers and chemists suggest them, so we welcome changes in the economic and social conditions of our country; but just as we insist upon measured judgments, sound tests, and orderly procedure in effecting the changes in our business, so we should call for orderliness, safety, and soundness in changes in society if we are to maintain democracy."

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Collapsible Taps, Self-Opening Die Heads; Bolt Threading, Pipe Threading, and Pipe Cutting-Off Machinery.

MURCHEY
Machine & Tool Co.
951 Porter St., Detroit, Mich.

SIZES: 1¼" to 12"

Lifting-and-Shifting Equipment For Light Loads

(CONTINUED FROM PAGE 46)

is to be used in a fixed position, that is, no shifting of the load is required, the hook or bolt type of suspension will be found satisfactory. A plain trolley (that is, one which may be moved by moving the load or pulling a tow cord) will serve where the load is light, the haul short and the path unobstructed, or where the haul is long but not often repeated, and where time is not an important factor.

A hand-geared trolley operated by a chain will be found useful where the haul is short and the load is too heavy or awkward to grasp, when the load must be accurately spotted regardless of its weight, or when the load must be moved carefully, as with hot foundry ladles or dangerous chemicals. A motor-geared trolley, driven by a separate motor and controlled from the floor, will be indicated when the haul is long, either with light or heavy loads, or when the operation must be repeated frequently and when speed is a factor of importance.

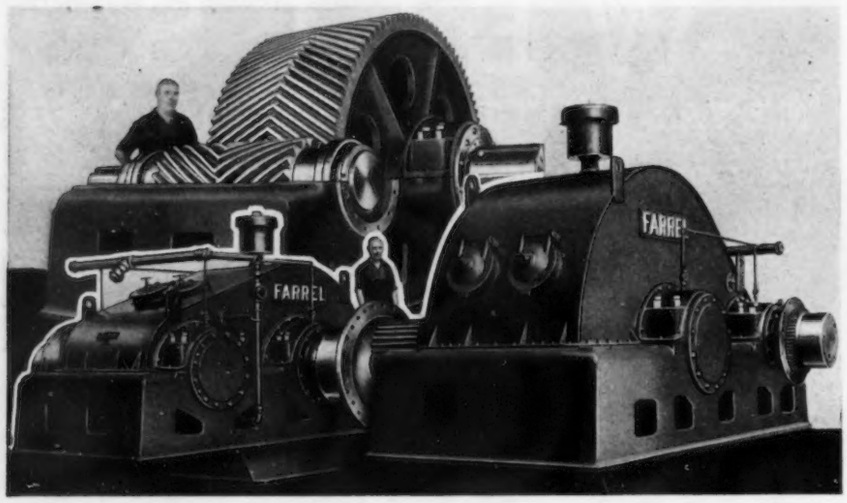
A motor trolley with a cab for the operator is desirable when the haul is exceptionally long and speed is essential; when numerous bays are to be served by one hoist and the paths under the hoist are encumbered.

5. The control of electric hoist operation may be of four general types: (A) Pendant cord control, floor-operated, consists of two cords, one for lowering and the other for hoisting. (B) Push button control, floor-operated, consists of two or more push buttons in a switch box attached to the end of a flexible conductor cable. (C) Remote control (generally by push buttons from a fixed station) is sometimes used with motor driven trolley hoists where it is difficult for the operator to walk along with the load, but where the size of the loads handled does not warrant the use of an operator's cab. (D) Cab control is used where it is desirable to have the operator go along with the hoist and the floor is obstructed.

Special Considerations

To the above must be added two other special points; the characteristics of the electrical current available in the shop, and the special conditions, if any, under which the hoist must operate, such as dust, fumes, moisture, or outdoor use. These two points have a decided influence on the type and make of hoist you may find available.

Finally, in making a selection between two or more hoists which meet all the conditions of service as outlined above satisfactorily, look carefully at the safety features which tend to make the operation of the hoist fool-proof or otherwise; the efficiency of the mechanism as shown in the power



PRECISION *and* STRENGTH *for* HEAVY DUTY SERVICE

Smooth, quiet operation is as essential in large mill drives as in smaller machines. High speeds and heavy loads subject the drive units to stresses and shocks which are successfully withstood only if the drives are properly designed for such service and built to high standards of accuracy.

The drives illustrated above are typical of the advanced engineering and precision manufacture of Farrel-Sykes Gear Units. The one at the left is a 4,000 H.P. drive for a 72" Four-High Reversing Cold Strip Finishing Mill and the unit at the right is a 1500 H.P. drive for the reel of the same mill. Inset shows the 1500 H.P. reel drive with its cover removed.

Both are single reduction units with cases of all-welded steel construction which have greater strength with less weight. The continuous tooth herringbone gears are accurately generated by the Sykes process. The gears are lubricated by built-in sprays and the bearings are flood lubricated, oil being supplied to both gears and bearings by a central lubricating system. The breathers mounted on the cover prevent oil contamination by trapping dirt and moisture.

Farrel-Sykes Gears and Gear Units are made in any capacity up to 10,000 H.P. for every type of industrial service. They are engineered to fit the job. When you have a drive problem send for a Farrel engineer.

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Canton, Ohio

required to operate it day in and day out; the durability of construction as evidenced by typical maintenance records; and at the accessibility of parts in case repairs are needed. Do not buy *any* hoist until you have studied these considerations with care, in relation to your own particular needs.

(The next article in this series will cover the field of large cranes and special hoisting apparatus.)

Controlling Production By Means of Standards

(CONTINUED FROM PAGE 49)

ing fixtures, and similar tools which can be adapted to a wide variety of work. As new parts come through the man in charge of methods tries to make use of such standard tools to meet the requirements of the new part. When this can be done he enters the number of the tool on the Operation Sheet. This, of course, is an essential part of the basic idea behind the Operation Sheet, which is to present the maximum possible amount of detailed information to the operator in order to give him as clear a picture as practicable of the work to be done. This will also serve to establish a standard method of procedure for similar parts in the future.

Selling the Foreman

Sometimes it is necessary to sell the foremen on the methods which are laid down and there is naturally a good deal of give and take between the methods man and the foremen. There is apt to be a tendency on the part of the latter to keep on doing things in the same old way, while the Methods Office tries to develop short cuts. The result is that they keep each other in line. Suggestions from either the operators or the foremen for improving the quality of the work, or method of doing it, are always welcomed, and many of the changes which are adopted emanate from the men themselves, who, of course, are closest to the work.

Where changes in time are involved the change agreed upon is made out on the slip which goes to the Methods Division and Cost Department to bring their data up to date.

The selection of Rate Setters is extremely important, because the successful operation of the whole system largely depends on their ability. The basis on which a man is selected for this is his knowledge of the work to be done and his adaptability to new conditions. The new Rate Setter is first given the job of setting time on work with which he is most familiar, and an attempt is made to broaden his knowledge by having him time-study different kinds of work. This provides some training in versatility which is highly necessary in setting time for the

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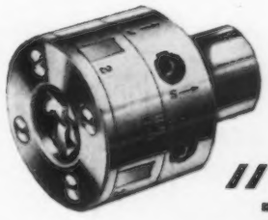
multitude of parts which must pass through his hands. Of course, it is absolutely essential that the Rate Setter understand and be able to analyze every move which the operator is required to make. Men in the different shop departments are constantly being trained as Rate Setters so that promotions may be made without entirely disrupting the organization. For instance, a good man in the lathe department will be given the job of setting time for lathe work. He will then be shifted to rate setting for bench work and after that for milling machines. It is not necessary that he be able to operate milling machines, but he must thoroughly understand how they are used and every move which the milling machine operator makes in turning out a piece of work.

Standard Data Are General

Because of the small quantity of parts on an order it is essential that the standard data be very general in character so as to cover a wide variety of conditions. This has lead to the grouping of certain classifications of work by which the operator is allowed a standard set-up time even though there may be a slight variation from the standard in the work which he does. For example, a turret lathe operator may have just completed a spur gear blank and be ready to start work on another. The nature of the set-up may be such that he makes a decided gain on his second job, or spur gear, because it is more or less similar to the first. In such a case he is allowed the same time as for the first which, of course, gives him an advantage in earning his bonus, as we shall see later.

In the shop office are three Rate Setters, each covering certain sections of the shop. They have boards on which the drawings, plus Operation Sheets with the time written in, for work to be done on different machines are filed in the order in which the parts are wanted. The machine tool operators come to the Rate Setters to get their work. In this office there is also a complete card file giving every step in the making of every part, together with the standard time for each step. These are available to all the operators, who can come in and consult the cards whenever they wish.

The bonus system is necessarily under the control of the Standards Department, and operates as follows. The standard time for the various operations and parts is based on what a normal operator can do in a normal day's work, under the conditions existing in this shop. When he receives his blueprint from the Rate Setter he reads the Operation Sheet to find out what work is to be done and then proceeds to set up the job and finish it. If the allowed time is 80 minutes and he does it in 60 minutes he is entitled to 20 minutes premium at a predetermined rate. The difference between the operator's hourly rate and the premium he receives goes



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Standardize on ARMSTRONG Socket Wrenches. (1st) For finer tools—chrome Vanadium Steel chrome plated. (2nd) for uniformity and interchangeability — ARMSTRONG SOCKETS are made in all sizes in all standard types. (3rd) for improved drop forged ratchets, and (4th) for the Drivelock Feature.

The patented ARMSTRONG Drivelock makes of every assembly a safe, rigid tool. A quarter turn of the lock pin locks socket to driver, driver to ratchet, section to section. With ARMSTRONG Drivelock tools you can use *any* standard make sockets.

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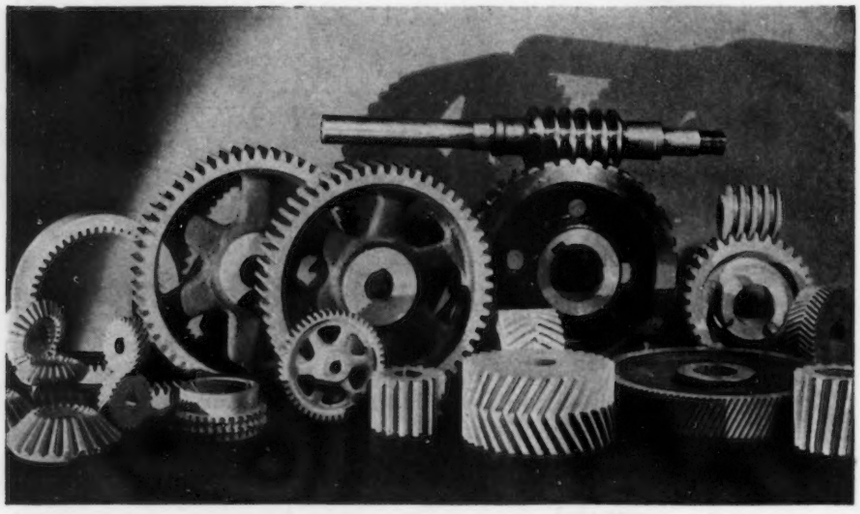
into a pool which pays the premium of the contributory labor, including helpers and foremen. To see how this is calculated let us take a concrete example. Suppose the man is paid at the rate of 75 cents per hour, or 1¼ cents per minute. If he produces 80 minutes of work in 60 minutes of time and saves 20 minutes he has earned 80 x 1¼ cents or $1.00. He is paid, let us say, 20 cents premium which, added to the 75 cents for his hourly rate (he did the job in an hour), makes 95 cents which is his due. The 5 cents left over is what goes into the pool for the bonus for the contributory labor.

The premium earnings are posted in the shop every day on the day following that on which the work has been done, so that each operator can check his figures and keep a running account of his premiums for the week. They are paid a premium for good work only, and are penalized for the allowed time on spoiled work. This penalty, however, is only deducted from premium earnings so that the men are always assured of their regular hourly pay.

Supervisory Labor

The manner in which the supervisory labor is given its premium is somewhat more complicated. Each foreman is, in effect, set up in business for himself. This is done through the medium of a Control Sheet on which all expenditures of his department, including the payroll, are figured on the basis of the cost per thousand units, in the form of a budget with liberal allowances for contingencies beyond the control of the shop. In this way a definite comparison can be made between estimated and actual costs. The latter will vary for different machines, operations and departments just as the standard time varies. A copy of the appropriate Control Sheet is given to each foreman every Friday with figures for the preceding week. The relation between the standard cost and the productive cost furnishes the basis for figuring the contributory labor premiums.

The form used for these Control Sheets is shown in Figs. 3 and 4. Such a sheet for a given shop department actually consists of two sheets. Fig. 3 is the Control Sheet proper and consists of three sections. The first gives the estimated and actual payroll cost in dollars and cents broken down as shown by the headings. The second section gives the same information in terms of work units —a work unit being the predetermined amount which should be produced per minute under normal conditions in this shop. The third section reduces the first two sections to percentages and cost per thousand work units. The next to the last column of this section gives the cost per thousand units on standing orders which is broken down into actual orders as shown in the second sheet, reproduced in Fig. 4. Each order is here broken down into actual money (left-hand column) and cost per thousand units (right-hand column). This gives an analysis of costs which are more or less fixed and gives the foreman a chance to hold them down so as to increase his bonus.



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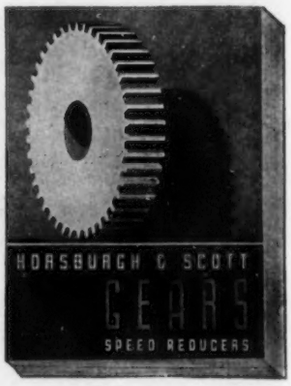

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RAILROAD BUYING

Pennsylvania Railroad will build 1500 box and 1000 gondola cars in its own shops. These are the cars for which bids were asked three weeks ago.

Minneapolis, St Paul & Sault Ste. Marie has ordered 550 freight cars for use on Western Central, 450 of which will be built by Pullman Standard Car Mfg. Co. and 100 by American Car & Foundry Co.

Norfolk & Western has ordered nine postal cars from Bethlehem Steel Co.

Youngstown & Northern is inquiring for one 0-6-0 switching locomotive.

Union Pacific is inquiring for prices on from 750 to 3000 freight cars, the information to be used in preparing appropriations.

Lehigh & New England has ordered 75 hopper cars from American Car & Foundry Co.

Grand Trunk Western is inquiring for three baggage cars.

Atlantic Coast Line has ordered 12 locomotives from Baldwin Locomotive Works.

Pere Marquette has applied for authority to issue $1,940,000 in equipment trust certificates to finance purchase of 15 freight locomotives from Lima Locomotive Works, 11 locomotive tenders from American Locomotive Co., 25 all-steel cabooses from Magor Car Co., and 10 all-steel baggage and express cars from St. Louis Car Co.

..CAST IRON PIPE..

Swanton Village, Vt., has awarded 11,000 ft. of 10-in. pipe to Central Foundry Co., 420 Lexington Ave., New York, at $1.53 a ft. with freight allowed to destination.

Swampscott, Mass., has awarded 358 lengths of 12-in. pipe and 116 lengths of 6-in., class C, to United States Pipe & Foundry Co.

Kingsport, Tenn., plans pipe lines for extensions in water system. Fund of $40,000 has been authorized for this and other waterworks installation.

General Purchasing Officer, Panama Canal, Washington, asks bids until April 13 for 10,180 ft. of 6- to 12-in. cast iron water pipe (Schedule 3239); until April 20, 2400 ft. of 4-in. (Schedule 3240).

Miami Beach, Fla., closes bids April 21 for about 7500 tons for ocean outfall pipe, water system extensions and sewage force line. Malcolm Pirnie, 25 West Forty-third Street, New York, is consulting engineer.

Sonora, Tex., plans pipe lines for water system and other waterworks installation. Bond issue of $90,000 has been authorized.

Menomonie, Wis., has let contract to James B. Clow & Sons Co., Chicago, for one carload for extensions in water system.

Annona, Tex., closes bids April 17 for pipe for water system; also for new pumping station and filtration plant. Municipal Engineering Co., 2906 Maple Avenue, Dallas, Tex., is consulting engineer.

Ontario, Cal., plans 16,330 ft. of 4-, 6- and 12-ft. for extensions in water system. Cost about $36,500. Financing has been arranged through Federal aid.

Granger, Wash., asks bids soon for about 18,830 ft. of 4-, 6- and 8-in. for water system; also for pumping equipment and other waterworks installation. Financing has been arranged through Federal aid. G. D. Hall, Larson Building, Yakima, Wash., is consulting engineer.

De Pere, Wis., has placed 100 tons of 6-in. water pipe with James B. Clow & Sons Co.

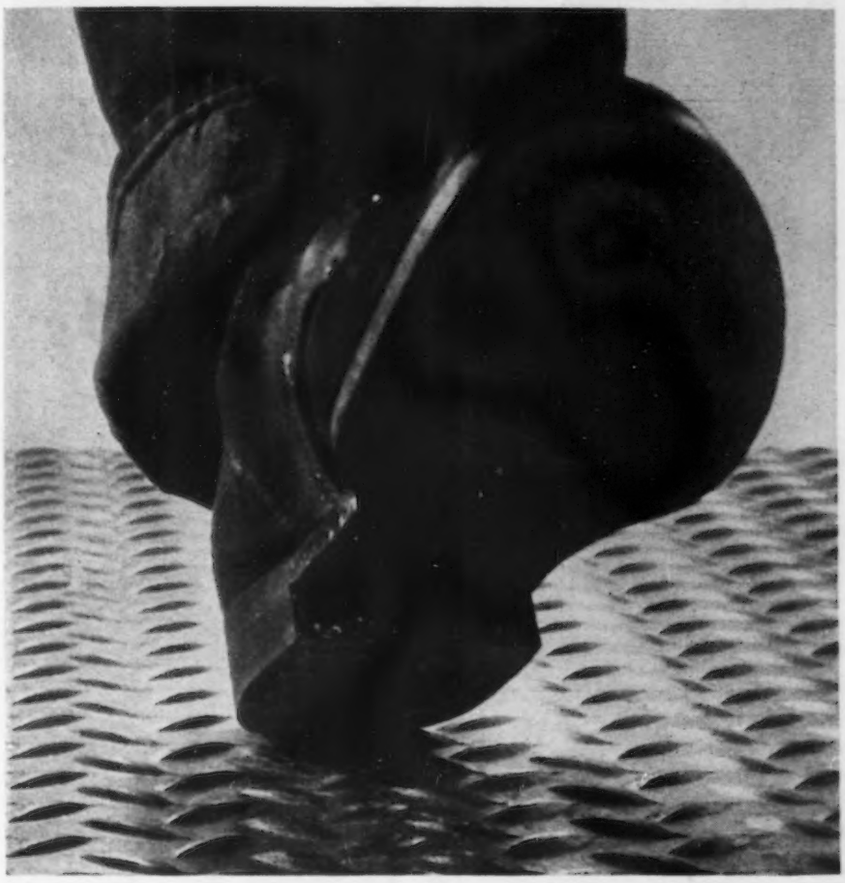
Brandon, Wis., has voted to build waterworks and sewage system with disposal plant costing $102,136. Erwin F. Yerk is village clerk.

Goldfield, Nev., plans pipe lines for water system and other waterworks installation. Financing is being arranged through Federal aid. James Clark, WPA engineer, is engineer for project.

Eldorado, Tex., has authorized bond issue of $120,000 for pipe lines for water system and other waterworks installation; also sewage system.

Kalamazoo, Mich., plans pipe lines for extensions and replacements in water system. Fund of $170,000 is being arranged for this and other waterworks installation. L. A. Cobb, Kalamazoo, is consulting engineer.

Circle, Mont., will take bids soon for about 18,400 ft. of 2- to 6-in. for water



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Means Safety Under Foot

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system; also about 225 ft. of 8-in., and for 75,000-gal. elevated steel tank and tower.

Ohio Public Service Co., Hanna Building, Cleveland, plans main water intake lines from Black River to Edgewater station, Lorain, Ohio. Cost about $175,000.

Oakland, Cal, East Bay Municipal Water District has awarded 340 tons of 6- and 20-in. to United States Pipe & Foundry Co. and 180 tons of 8-in. to American Cast Iron Pipe Co.

Los Angeles Department of Water and Power has awarded 106 tons to an unnamed bidder.

Hawthorne, Cal., will open bids April 12 on 102 tons of 2-, 4- and 6-in. for a water supply system.

....PIPE LINES....

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until April 29 for 35,200 ft. of black and galvanized steel pipe, ¼-in. to 6-in. (Circular 145).

United States Engineer Office, Charleston, S. C., closes bids April 13 for one cast steel discharge pipe, with hand hole cover and pattern, and for 12 cast iron half bushings (Circular 71).

Sinclair-Prairie Oil Co., Tulsa, Okla., about 25,000 ft. of 6-in. welded steel pipe near Moore, Okla., for crude oil transmission.

Skelly Oil Co., Skelly Building, Tulsa, Okla., has authorized 4-in. welded steel pipe line in section of N. E. Thirtieth Street, for crude oil transmission. Cost over $40,000.

El Paso Natural Gas Co., El Paso, Tex., will soon start construction of 8½-mile, 6-in. pipe line to refinery of Chino Copper Co. at Hurley, N. M., from connection with 5-in. line near White Water; a 21-mile, 4-in. line from 12- in. main near Lordsburg, N. M., will be built to supply natural gas for distribution in Lordsburg. Company will also build a 46-mile, 6-in. natural gas pipe line from main 10-in. line near Redrock, Ariz., to Hayden, Ariz., to refineries of Nevada Consolidated Copper Co. and American Smelting & Refining Co. All lines will be Lindewelded.

Union Oil Co. of California, Inc., Union Oil Building, Los Angeles, has work under way on welded steel pipe line from Santa Maria, Cal., oil field to bulk terminal plant on waterfront, for crude oil transmission from company wells at first noted place. Cost close to $225,000.

Panhandle Eastern Pipe Line Co., Kansas City, Mo., has placed orders for 285 miles of 18-, 20-, 22- and 24-in. pipe totaling 65,000 tons. National Tube Co.'s share of the order, which is approximately 60 per cent, will be seamless tubing, the remainder has been let to A. O. Smith Corp. and will be welded pipe. It is expected that the pipe will be used for loops on existing line.

OLIVER IRON AND STEEL CORPORATION
PITTSBURGH, PA.

Mesta Refuses to Sign SWOC Contract

Mesta Machine Co., Pittsburgh, last week announced that "the company is not prepared to enter into any signed contracts" with the Steel Workers' Organizing Committee, although it was indicated that Mesta would recognize the SWOC to a limited extent on behalf of their employees who are members of the union. Quick to answer this challenge, officials of the SWOC announced that the union would not accept the refusal of the Mesta Machine Co. to enter into a written contract.

In its announcement to the SWOC, Mesta said that there was no use of any further meetings as long as the signed contract was the question to be discussed, but the company signified willingness to meet on all other items provided the requests for future conferences were in writing, specifying the purpose of such conference. The SWOC, claiming a 95 per cent membership, reiterated a request that the company enter into a written contract.

Una Welding, Inc., Cleveland, is building a plant addition, increasing its floor space about 30 per cent in order to increase its capacity both in the manufacture of welding rod manufacturing equipment and for the manufacture of automatic welding heads and fixtures.

★

Specialists in

Alloy and Tool Steel

TUBING

Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.

The Tubing Specialists

March Pig Iron Daily Output Up 4.2 Per Cent

PRODUCTION of coke pig iron in March was 3,459,473 gross tons, compared with 2,999,218 in February. The daily rate last month increased 4.2 per cent over that in February, or from 107,115 to 111,596 tons.

On April 1 there were 182 furnaces making iron, operating at a rate of 112,970 tons daily, against 176 on March 1, producing 108,720 tons daily. Six furnaces were put in blast during the month and none was taken off. The steel corporation blew in one furnace, independent steel companies blew in four furnaces, and merchant iron producers put one in operation.

Among the furnaces blown in are the following: One Bethlehem and one Cambria, Bethlehem Steel Co.; one Duquesne, Carnegie-Illinois Steel Corp.; Norton furnace, American Rolling Mill Co.; one Brier Hill, Youngstown Sheet & Tube Co., and North Birmingham No. 4, Sloss-Sheffield Steel & Iron Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1937	1936	1935	1934	1933
January	103,597	65,351	47,656	39,201	18,348
February	107,115	62,886	57,448	45,131	19,798
March	111,596	65,816	57,098	52,243	17,484
April	....	80,125	55,449	57,561	20,787
May	....	85,432	55,713	65,900	28,621
June	....	86,208	51,750	64,338	42,166
½ year	....	74,331	54,138	54,134	24,536
July	....	83,686	49,041	39,510	57,821
August	....	87,475	56,816	34,012	59,142
September	....	91,010	59,216	29,935	50,742
October	....	96,512	63,820	30,679	43,754
November	....	98,246	68,864	31,898	36,174
December	....	100,485	67,950	33,149	38,131
Year	....	83,658	67,556	43,592	26,199

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1937	1936	1937	1936
January	3,211,500	2,025,885	23,060	24,766
February	2,999,218	1,823,706	24,228	24,988
March	3,459,473	2,040,311	27,757	22,725
April	.....	2,403,683	....	19,667
May	.....	2,648,401	....	18,363
June	.....	2,586,240	....	17,549
½ year	.....	13,528,226	....	128,058
July	.....	2,594,268	....	20,205
August	.....	2,711,721	....	20,658
September	.....	2,730,293	....	15,919
October	.....	2,991,887	....	19,805
November	.....	2,947,365	....	24,368
December	.....	3,115,037	....	25,715
Year	.....	30,618,797	....	254,728

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1937	1936	1935	1934	1933
January	16,106	10,537	3,926	7,800	2,602
February	16,514	11,296	6,288	7,071	2,863
March	16,457	10,831	7,089	7,197	2,412
April	....	13,897	8,799	8,838	1,908
May	....	12,814	8,441	9,099	3,129
June	....	14,209	7,874	9,499	4,088
July	....	11,619	8,644	7,880	6,783
August	....	12,148	8,194	6,043	7,756
September	....	12,526	10,090	4,986	10,034
October	....	13,645	11,199	5,765	8,634
November	....	14,739	12,503	6,610	7,639
December	....	14,852	13,312	4,399	8,358

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) March (31 Days)	Production (Gross Tons) February (28 Days)	April 1 Number in Blast	April 1 Operating Rate, Tons a Day	March 1 Number in Blast	March 1 Operating Rate, Tons a Day
New York:						
Buffalo	240,477	209,915	12	7,755	12	7,495
Other New York and Mass.	7,405	5,365	1	240	1	190
Pennsylvania:						
Lehigh Valley	84,005	69,019	7	2,985	6	2,515
Schuylkill Valley	38,511	36,581	3	1,240	3	1,305
Susquehanna and Lebanon Valleys	23,112	24,851	1	745	1	890
Ferromanganese	.....	.....	0	....	0	....
Pittsburgh District	801,335	703,996	38	26,150	37	25,710
Ferro. and Spiegel	10,375	9,323	2	335	2	335
Shenango Valley	72,238	66,350	4	2,330	4	2,370
Western Pennsylvania	109,014	86,065	6	4,015	5	2,745
Ferro. and Spiegel	14,247	12,075	2	460	2	430
Maryland	138,132	120,110	5	4,455	5	4,290
Wheeling District	159,179	145,160	7	5,135	7	5,185
Ohio:						
Mahoning Valley	356,960	303,427	17	11,670	16	11,185
Central and Northern	282,921	236,822	14	9,125	14	8,460
Southern	55,170	40,991	4	17,80	4	1,715
Illinois and Indiana	681,394	595,831	30	21,980	30	21,880
Michigan and Minnesota	94,286	88,685	6	3,040	6	3,165
Colorado, Missouri and Utah	44,699	39,358	3	1,440	3	1,405
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	3,135	2,830	1	100	1	100
Kentucky	20,429	5,949	2	810	1	330
Alabama	220,688	195,310	16	7,125	15	6,975
Tennessee	1,761	1,205	1	55	1	45
Total	3,459,473	2,999,218	182	112,970	176	108,720

Wheeler Disputes President on Copper

WASHINGTON, April 6.—Senator Wheeler, Democrat, of Montana, has taken sharp issue with the President's statement that the price of copper is too high. The Montana Senator previously broke with the President over the latter's proposal to pack the Supreme Court. The attack on the President's contention that copper prices are too high appears to widen the breach. The attack made by the President on steel prices is just as vulnerable as that made on copper prices, but Wheeler was interested as it related to copper inasmuch as Montana is one of the chief copper producing states of the country.

Wheeler said it would be impossible for American miners "to have a half-way decent standard of living" if prices were reduced "by an appreciable extent." Presi-

dent Roosevelt said copper could be sold profitably at 5c. or 6c. a lb. by many companies and at 8c. or 9c. a lb. by others.

Said Senator Wheeler:

"I am sure the President is wrong when he states that mines in Montana can produce at 8c. or 9c. and make a profit, and that mines in other parts of the country can make money on 5c. or 6c. copper.

"I am sure the mines in Montana cannot make any money and pay present wages on 8c. or 9c. copper. They have a wage scale in Butte now, I am told, of $6 a day for ordinary miners.

"The wages go up or down automatically with the price of copper, pursuant to the contract the companies have with the miners.

"When copper sold around 8c. or 9c. a lb., companies in Butte had to curtail production. . . . No copper mines in the United States can produce copper for anything like 5c. or 6c. a lb. now. Very few of them can produce and pay the present wages on 9c. or 10c. copper.

"Independent mining companies in Butte tell me they have to get at least 14c. in order to pay the present wage scale.

Wheeler said, "Africa, with its slave labor, is today the big competitor of American copper," and added, "I know of no one in America who wants to see American miners placed in a position where they have got to compete with either slave labor of Africa or peons of Mexico."

Malleable Castings Orders Increase

PRODUCTION of malleable iron castings totaled 57,295 net tons in February, compared with 53,638 tons in January and 40,611 tons in February, 1936. Orders totaled 60,187 tons, compared with 54,070 tons and 38,278 tons. Orders in the first two months exceeded production by 3324 tons.

Orders for fabricated steel plate in February amounted to 30,340 tons, against 40,424 tons in the month preceding and 27,863 tons for February, 1936. The figures for both castings and plate were released by the Department of Commerce.

Congdon & Carpenter Co., Providence steel jobbing concern, has purchased a site at 14th and Bedford Streets, Fall River, Mass., where it will construct a new warehouse to be ready for occupancy Dec. 1.

G-E Opens Industrial Products Display

AN exhibit of electrical products for industry was opened April 5 in the General Electric Building, 570 Lexington Avenue, New York. It brings together, in 7000 sq. ft. of floor space, a complete line of representative products of the General Electric Co., and its affiliates.

This exhibit, which will continue for several weeks, includes latest designs of a wide variety of equipment, much of it shown in operation. Fractional-hp. and integral motors and industrial controls comprise a large section and there is an attractive display of meters and instruments. Three late model welding sets are in operation and a variety of welding electrodes and accessories are to be seen. A section is devoted to industrial heating, and other sections to switchgear and turbines.

Products of the company's incandescent lamp department, air conditioning department and the construction materials division and the plastics division are on display, as well as the products of the Trumbull Electric Co., General Electric X-Ray Corp., Warren Telechron Clock Co., General Electric Vapor Lamp Co., Bailey Meter Co., Locke Insulator Corp., and the Carboloy Co.

Motor exhibits include a large assortment of assembled and disassembled units, and the story of instruments is told in part by an interesting series of transparencies. A wide variety of time switches, demand meters, recording instruments, portable and small panel instruments and watthour meters is shown.

Electric brazing, annealing and normalizing furnaces, including the new roller-hearth type, are shown photographically in the heating section, together with numerous samples of work. The steam turbine exhibit includes a 30-hp. mechanical drive unit for fans, pumps, etc., and large photos of turbine applications in various industries. Samples of blading, buckets, governors, etc., are on display, and the method of flash welding nozzle diaphragms is shown. Products of the transportation department are shown pictorially, and there is a comprehensive exhibit of police radios and accessories.

Desist Order Issued On Turbo-Generators

THE Federal Trade Commission has served upon General Electric Co., Westinghouse Electric & Mfg. Co., Elliott Co. and Allis-Chalmers Mfg. Co. an order to cease and desist from entering into or maintaining any conspiracy to fix and maintain uniform delivered prices in the sale of turbine generators and from selling turbine generators by agreement upon uniform performance guarantees. The order directs the respondents to cease and desist from engaging in

General Electric opens an exhibition of electrical products for industry in New York.

the following acts in furtherance of any such conspiracy:

Selling turbine generators upon uniform performance guarantees where the guarantees are not based upon actual performance;

From using the pricing sheets of any of the companies as the pricing sheets of any of the others;

From submitting uniform bids.

The order, however, does not prohibit the exchange of scientific information, if not used for unlawful price fixing.

The order was predicated upon a complaint of the commission charging a price fixing conspiracy in the sale of turbine generators, the purchasers of which are chiefly the Federal Government, State governments, municipal governments, and public utilities, and upon the answers of the companies admitting, for the purposes of the proceeding, only, the said conspiracy and the commission's finding that the conspiracy had been entered into.

In the same proceeding, the commission further ordered the Westinghouse Electric & Mfg. Co., Allis-Chalmers Mfg. Co., Elliott Co., Worthington Pump & Machinery Corp., Foster-Wheeler Corp., C. H. Wheeler Mfg. Co., Ingersoll-Rand Co., and Ross Heater & Mfg. Co. to cease and desist from carrying out and entering into a similar conspiracy with respect to the sale of condensers, which are also sold chiefly to the Federal Government, State governments, municipal governments and public utilities. The order as to these companies prohibits the use of any means by way of disciplinary action to carry out the conspiracy.

Among the respondents was the Heat Exchange Institute, as to which the commission ordered the proceeding dismissed for the reason that the companies manufacturing condensers are only a section of the Heat Exchange Institute, and for the further reason that compliance with the order by those engaged in the condenser industry will be just as effective as an order to cease and desist issued against the Heat Exchange Institute.

The companies are given 60 days to file a report in writing, stating in detail the manner in which the order has been complied with.

McAleer Mfg. Co., 2431 Scotten Avenue, Detroit, has appointed Crown Rheostat & Supply Co., Chicago, as an exclusive distributor in the Chicago district of buffing compounds for metals and finishes.

U. S. Steel Holds Annual Meeting

AT the annual meeting of stockholders of the United States Steel Corp. held at Hoboken, N. J., on Monday, Myron C. Taylor, chairman of the board, intimated that there may be an early resumption of dividends on the common stock.

"You have been very patient," Mr. Taylor told the stockholders. "I have personally a great ambition to see you all well rewarded for your patience, and my greatest desire and deepest concern at this moment is that in some way—and not too far away—this patience shall have been justified.

"I have one feeling that always comes to mind whenever I attend an annual meeting of the United States Steel Corp.," he said, "a feeling which in one form or another I am always inclined to express.

"It is that if, through any chance, the vicissitudes of time or circumstances should make it impossible for any of us to gather here together in this way next year, I want to express openly my appreciation—my own very great pleasure in this association with our stockholders and executives, although the work and experience have been difficult in the extreme."

On the subject of labor relations, he said that there was no real conflict in interest between the people who own the property and the people who operate it.

"But one can be created," he added, asserting that the only rule was that each should be paid according to his contribution. "So long as men are men, and women are women, no one is going to be wholly satisfied with the pay some one thinks he or she ought to get.

"The corporation has a long and honorable record of fair dealing with those who work for it. It may not be generally known, but I think it is so that the corporation has been an absolute leader in welfare, sanitation and working conditions, in accident prevention, accident compensation and in pensions.

"As to the future, I would not care to prophesy," he continued. "This much, however, may be taken as fact. In 1935 I called attention to the consumption of steel per capita in the United States of 250 lb. per capita in 1932. I stated there was no sound reason why we should not again reach 800 or 900 lb. per capita.

'In 1936 production was actually 810 lb. per capita and present production is at the rate of 960 lb. per capita."

Acute Shortage of Tungsten Ore

AN acute shortage of tungsten for tool steels is now apparent, owing to the scramble of Europeon nations for war materials. It has become almost impossible to purchase tungsten concentrates from the usual foreign sources. The trading companies have withdrawn almost all offers from the markets and in some cases have been unable to fill present contracts. The world price of ore has advanced 100 per cent since last fall, and buyers find little or none available in the market. While most makers of high-speed tool steels advanced their prices about 7c. a lb., effective April 1, in order to cover increased labor costs and advances in the price of their raw material, this rise, is is said, does not cover the additional advance in the price since placed into effect on tungsten nor does it cover the higher production costs which seem inevitable. Further price increases are probable.

The principal foreign sources of tungsten are China, the Malay States, and Burma. The Burmese and Malayan production is British controlled, and at no time have these sources of supply offered much tungsten for markets other than England. While little is known of the exact nature of arrangements made for control of the remaining tungsten supply, the output of China appears to have been taken up by foreign countries, principally Germany and England.

American consumers find themselves with practically no reserve stocks to tide them over the acute shortage of tungsten. High-speed steel scrap is at a premium, and becoming very scarce.

The United States is fortunate in one respect, however, in that it has an available supply of tungsten ores within its borders. Commercially active deposits are situated in Colorado, Nevada, and California, where the Firth-Sterling, Nevada- Massachusets, and Atolia interest have mines and concentrating mills. The developed production of these deposits is not great enough to meet the United States' full requirements for tungsten in the ordinary type of high speed tool steels, but it would be sufficient to meet the country's high-speed steel requirements if molybdenum steels or tungsten carbides are substituted.

FABRICATED STEEL

. . . Lettings slightly higher at 36,650 tons compared with 35,550 tons last week.

o o o

. . . New projects decline to 19,510 tons as against 24,900 tons a week ago.

o o o

. . . Plate awards call for 2755 tons.

NORTH ATLANTIC STATES

Fall River, Mass., 100 tons, newspaper plant, to Haarmann Steel Co., Holyoke, Mass.

Meriden, Conn., 200 tons, plant addition, International Silver Co., to Austin Co., Cleveland.

New York, 750 tons, Woolworth store, Fifth Avenue and 39th Street, to Bethlehem Steel Co.

New York, 140 tons, garage, 11th Avenue and 24th Street, to Harris Structural Steel Co., Plainfield, N. J.

Brooklyn, 1575 tons, automotive vocational high school, to Harris Structural Steel Co.

Brooklyn, 210 tons, theater on Graham Avenue, to Berkshire Structural Steel Co.

Minetto, N. Y., 245 tons, building for Columbia Mills, Inc., to Rogers Structural Steel Co., Corry, Pa.

Poughkeepsie, N. Y., 200 tons, Western Printing Co., addition, to Bethlehem Fabricators, Inc, Bethlehem, Pa.

Bridgeton, N. J., 190 tons furnace bindings, Owens-Illinois Glass Co., to Belmont Iron Works, Philadelphia.

Coatesville, Pa., 180 tons, Reading Railraid bridge, to Phoenix Bridge Co., Phoenixville, Pa.

Seward, Pa., 450 tons, alterations to power station, Pennsylvania Electric Co., to American Bridge Co.

Philadelphia, 210 tons, train shed, Crown Can Co., to Bethlehem Steel Co.

Philadelphia, 160 tons, hangars, Treasury Department State Procurement Division, to Anthracite Bridge Co., Scranton, Pa.

Allenport, Pa., 180 tons, extension to building for Pittsburgh Steel Co., to Fort Pitt Bridge Works Co., Pittsburgh.

Erie, Pa., 800 tons, car unloader, to Industrial Brown Hoist Corp.

Wilmington, Del., 270 tons, hospital addition, to Dietrich Brothers, Baltimore.

SOUTH AND SOUTHWEST

Norfolk, Va., 1000 tons, Ford building, to Bethlehem Steel Co.

Franklin, Va., 250 tons, paper mill buildings, Chesapeake Camp Corp., to Bethlehem Steel Co.

Winston-Salem, N. C., 600 tons, building, R. J. Reynolds Tobacco Co., to Belmont Iron Works.

Chapel Hill, N. C., 420 tons, gymnasium, to Carolina Steel & Iron Co., Greensboro, N. C.

Alcoa, Tenn., 1350 tons, pot shells, Aluminum Co. of America, to Bethlehem Steel Co.

Lexington, Ky., 240 tons, student union building, University of Kentucky, to International Steel & Iron Co., Evansville, Ind.

Louisville, 265 tons, tobacco warehouse, to Louisville Bridge & Iron Co., Louisville.

New Orleans, 160 tons, addition and alterations to Jung Hotel, to Jones & Laughlin Steel Corp.

Alamogordo, N. M., 155 tons, dam gates, to John Beam.

Beverly, Tex., 250 tons, power houses, dams Nos. 1 and 2 for Lower Colorado River Authority, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

Detroit, 18,230 tons, strip mill for Great Lakes Steel Corp., to Bethlehem Steel Co.

Dearborn, Mich., 2525 tons, balcony transfer building, Ford Motor Co., to J. A. Utley Co.

Alanson, Mich., 125 tons, bridge, to Duffin Iron Works, Chicago.

Cleveland, 100 tons, alterations to Statler Hotel, to Republic Structural Iron Works, Cleveland.

Bluffton, Ohio, 350 tons, boiler house for Veterans' Home, to Fort Pitt Bridge Works Co.

Dayton, Ohio, 115 tons, Joyce-Cridland factory, to Burger Iron Co., Akron, Ohio.

Dayton, 350 tons, office and factory building, Standard Register Co., to Fort Pitt Bridge Works Co.

Frazeysburg, Ohio, 125 tons, bridge, to Dover Tank & Plate Co.

Athens, Ohio, 200 tons, printing plant, McBee Printing Co., to Austin Co., Cleveland.

Norwood, Ohio, 210 tons, building for Hilton-Davis Chemical Co., to Joseph T. Ryerson & Son, Inc.

Minneapolis, 200 tons, garage and store building addition for Dayton Co., to American Bridge Co.

Minneapolis, 790 tons, repairs to Mississippi River bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

Brookings County, S. D., 125 tons, underpass, to Pittsburgh-Des Moines Steel Co.

Minnehaha County, S. D., 115 tons, bridge, to Des Moines Steel Co., Des Moines, Iowa.

Topeka, Kan., 1800 tons, State and city bridge, to Kansas City Structural Steel Co., Kansas City, Kan.

WESTERN STATES

Green River, Wyo., 315 tons, overhead bridge, to Clinton Bridge Works, Clinton, Iowa.

Las Animas County, Colo., 180 tons, highway bridge, to Midwest Steel & Iron Works Co., Denver.

San Francisco, 225 tons, Parker bridge, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Boston, 5000 tons, Suffolk County court house.

Montpelier, Vt., 150 tons, overpass.

Hartford, 250 tons, building addition, Connecticut General Life Insurance Co.

Flushing, N. Y., 300 tons, highway bridges, New York World's Fair.

Buffalo, 500 tons, cancer hospital.

Port Byron, N. Y., 350 tons, school; Duplex Construction Co., Glens Falls, general contractor.

Luke, Md., 400 tons, boiler house extension. West Virginia Pulp & Paper Co.

Washington, 200 tons, addition to Eastern high school.

THE SOUTH

Lexington, Ky., 200 tons, junior high school building.

Owensboro, Ky., 500 tons, factory building.

Dallas, Tex., 2000 tons, refinery.

CENTRAL STATES

Toledo, Ohio, 1500 tons, vocational high school.

Toledo, 700 tons, building.

Van Wert, Ohio, 100 tons, building for Container Corp.

Chicago, 1400 tons, Central Steel & Wire Co. warehouse.

Riverdale, Ill., 200 tons, Acme Steel Co.

State of Illinois, 400 tons, bridges.

State of Indiana, 100 tons, bridges.

Sauk County, Wis., 130 tons, bridge; bids close April 16.

St. Louis, 4600 tons, building.

WESTERN STATES

Denver, 150 tons, Bureau of Reclamation project; bids opened.

Los Angeles, 380 tons, Culver Boulevard bridge; bids April 12.

FABRICATED PLATES

AWARDS

Kingston, N. Y., 130 tons, standpipe, to Chicago Bridge & Iron Works, Chicago.

Leetsdale, Pa., 135 tons, oil barge, Standard Oil Co. of Ohio, to American Bridge Co.

Pittsburgh, 160 tons, nine welded oil tanks for Penola, Inc., to Miles P. Brown.

Neville Island, Pa., 200 tons, 11 tanks for Neville Chemical Co., to Pittsburgh-Des Moines Steel Co.

Donora, Pa., 195 tons, two tanks for Chester Engineers, to Chicago Bridge & Iron Works.

Overton, Tex., 235 tons, two tanks for Humble Pipe Line Co., to Chicago Bridge & Iron Works.

Manitowoc, Wis., 500 tons, 1,500,000-gal. elevated tank, to Chicago Bridge & Iron Works.

St. Louis, 1200 tons, eight oil barges for the United States Engineers office, St. Louis, to Ingalls Iron Works Co.

. . . Awards of 7265 tons —4900 tons in new projects.

AWARDS

Nashua, N. H., 250 tons, Nashua Mfg. Co. plant addition, to Joseph T. Ryerson & Son, Inc.

Beverly, Mass., 350 tons, United Shoe Machinery Corp. manufacturing plant, to Joseph T. Ryerson & Son, Inc.

West Point, N. Y., 250 tons, barracks for military academy, to Carroll-McCreary Co., New York.

Syracuse, N. Y., 310 tons, PWA project, to Concrete Steel Co.

Erie, Pa., 185 tons, water reservoir, to Bethlehem Steel Co.

Allentown, Pa., 200 tons, store building, to Bethlehem Steel Co.

Toledo, 300 tons of rail steel reinforcing bars for National Milling Co., to Calumet Steel Co.

Milwaukee, 600 tons of rail steel reinforcing bars, grain elevator for National Milling Co., to Worden-Allen Co.

State of Illinois, 630 tons, road and bridge work, to unnamed bidders.

Fond du Lac, Wis., 250 tons, Holy Name monastery, to Bethlehem Steel Co.

Minneapolis, 650 tons, filtration plant, to Cowin Co., Minneapolis.

Minneapolis, 750 tons, Dayton store, to Calumet Steel Co.

Omaha, Neb., 850 tons, water supply system, to Sheffield Steel Corp.

Omaha, 860 tons, Armour & Co. building, to Concrete Engineering Co.

Potholes, Calif., 178 tons, Gilo project, to Soule Steel Co.

Knob, Calif., 177 tons, All American Canal project, to Colorado Fuel & Iron Co.

Hatch, N. M., 192 tons, Caballo dam project, to Concrete Engineering Co.

Denver, 122 tons, State bridge, to an unnamed bidder.

Los Angeles, 150 tons, State bridge and highway work, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Boston, 300 tons, Suffolk Country courthouse.

Buffalo, 130 tons, South Buffalo pumping station, for Buffalo Sewer Authority.

Sandstone, Minn., 800 tons, rail steel reinforcing bars, for jail; bids in.

State of Indiana, 600 tons, road and bridge work.

State of Wisconsin, 500 tons, road and bridge work.

Potholes, Calif., 2114 tons, All American Canal project; bids opened.

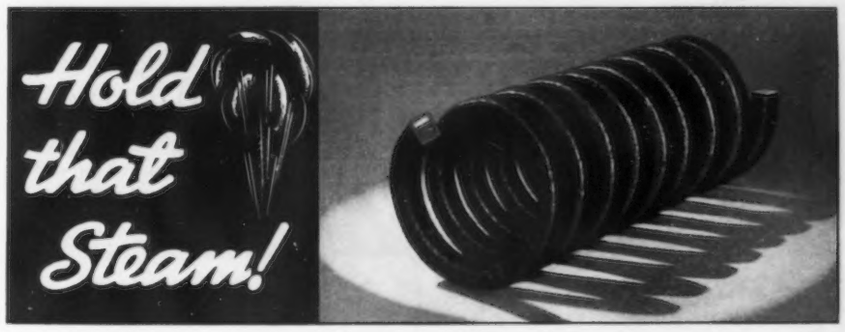
Denver, 315 tons, All American Canal project; bids opened.

Cody, Wyo., 138 tons, Shoshone reclamation project; bids opened.

Report Sought on Piling Collusion

WASHINGTON, April 6.—President Roosevelt today instructed his secretary, Stephen Early, to inquire of the Department of Justice as to progress the department has made in its investigation regarding alleged collusive bidding on sheet piling contracts in connection with PWA projects. The department took up a study of the matter about one year ago after charges were made by Secretary of the Interior Ickes.

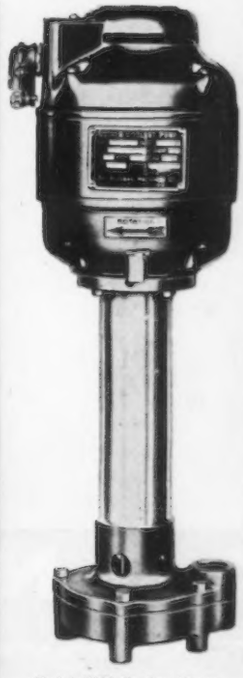
Baldwin Locomotive Works and subsidiary companies, including the Midvale Co., received orders during February valued at $3,331,742, compared with $3,600,301 for February, 1936. Consolidated shipments in February were $2,647,713, against $1,235,340 in February, 1936. At end of the month consolidated unfilled orders totaled $30,540,545, compared with $30,531,416 at the year's opening.



GARLOCK 150 High Pressure Packing holds steam in check even under pressures up to 300 pounds per square inch—saves power—and lasts so much longer than ordinary packing that you avoid costly shutdowns for frequent re-packing. Cut overhead in your plant . . . use GARLOCK 150.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada, Limited, Montreal, Que.

Garlock 150



Model 'UL' Gusher Pump with Polyphase Motor.

"GUSHER" COOLANT PUMPS

More and more of the better manufacturers of quality machine tools are specifying Ruthman Gusher Coolant Pumps for original equipment.

There must be a good reason for this.

Gusher Pumps operate with minimum friction—full ball bearing—no stuffing boxes — no metal-to-metal contacts within the Pump.

THE RUTHMAN MACHINERY COMPANY
537 EAST FRONT ST., CINCINNATI, OHIO

Steel Use in 1936 2350 lb. Per Family

APPARENT consumption of finished steel in the United States last year was about 2350 lb. per average family, a sharp increase over the 1935 consumption of 1700 lb. per family and the highest per-family consumption since 1929.

In no foreign steel-making country did the apparent steel consumption per family come within 20 per cent of consumption in this country, according to an estimate by the American Iron and Steel Institute.

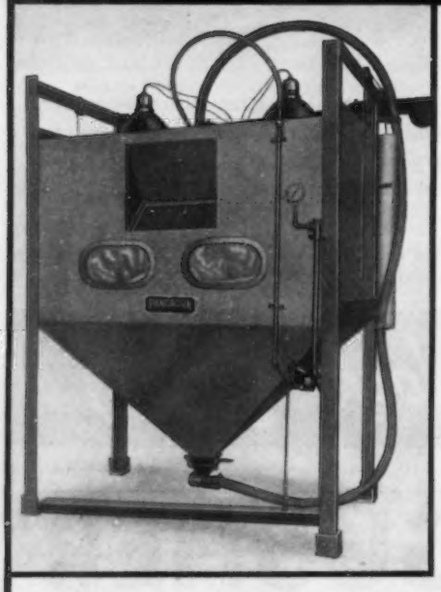
The 1936 consumption of finished steel per American family, however, was 12 per cent below the average annual consumption of 2675 lb. per family from 1925 through 1929, and was about 20 per cent below the 1929 peak consumption of 2950 lb. per family.

Reflecting the steady advance of American standards of living, steel consumption per family has risen greatly since 1900, when only 1060 lb. of finished steel were consumed per average family. The only major setbacks in the rise occurred in 1908 and 1921, when consumption per family dropped to 1138 lb. and 1075 lb., respectively, and during the recent depression, when consumption per family dropped as low as 760 lb. in the year 1932.

Per family consumption of steel in the United States last year was 500 lb. higher than in any foreign country. Among the leading foreign steel producing nations, Germany led with apparent consumption of 1850 lb. of finished steel per family, while in Belgium-Luxemburg, 1720 lb. per family were consumed. In Great Britain, the consumption per family amounted to 1350 lb., and in France, 1250 lb. In Russia and Japan the consumption of finished steel per family was respectively 60 and 40 lb.

Apparent consumption of finished steel per year is estimated by adding to the amount of finished steel produced in this country the amount imported from other countries, and then deducting the tonnage exported.

BLAST CLEANING EQUIPMENT



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PANGBORN CORPORATION . . . HAGERSTOWN, MARYLAND

Germany Sells Steel To Great Britain And Buys Scrap

LONDON *(Special Correspondence).*— Shipments of scrap iron greatly in excess of normal trade requirements have been pouring into Hamburg, Germany, from British ports during the past few weeks. It is understood that these are being sent over by British concerns which fear an export embargo, and which are also attracted by the excellent price paid.

In view of the shortage of iron for rearmament and other purposes, the German Government is not only releasing foreign currency for its purchases, but is allowing a price above the normal market rate to be paid for quick delivery.

At the same time, 22 British buyers have been in Germany to negotiate heavy purchases of steel. Large orders which they were unable to place in the United Kingdom will be executed in Germany at a reasonable price and in good time.

Two explanations of this unusual situation suggest themselves: either that Germany, in need of foreign currency, is prepared to give foreign orders priority over rearmament and the Four-Year

Plan; or that her industry is better able than the British to meet any additional strain imposed upon it.

The average working day in the Ruhr is 14 hr. In Britain day and night shifts are being worked, as well as overtime. Nevertheless, Germany is not only meeting rearmament demands at least as heavy as Britain's, but is holding her export trade as well. Notwithstanding the demand for steel, there are still works in the United Kingdom closed down.

New Industrial Truck Controller Prevents "Plugging"

THE bulk of the maintenance costs in connection with the operation of industrial trucks is directly traceable to "plugging"—starting from a dead stop in high speed, or throwing the controller from full speed forward to full speed reverse without stopping the motion of the truck. The great overloads and sudden reversals of stress imposed by this practice on motors, axles, running gear, tires and batteries have always been decried, but careless operators will persist in mistreating the equipment in their care. Mechanical control-interlocking devices have not been sufficient to overcome the practice, since most of them can be easily disconnected.

The announcement, therefore, of a new non-plugging control is welcome news to industrial truck users. Under the name "NoPlug" Controller (patent applied for) this device is now standard on all Baker industrial trucks, and can be installed on most Baker trucks already in service.

The "NoPlug" controller prevents starting overloads by requiring the truck operator to start in first speed and to use the acceleration speeds which are provided. Instantaneous reversal is eliminated by making it necessary for the operator to bring the truck almost to a complete stop before power can be applied in the reverse direction. These inherent characteristics reduce both the maintenance costs and the time out for repairs, and result in longer life for the truck and its batteries. The "NoPlug" feature is so designed that it cannot be removed or disconnected, and consequently full protection is assured for the life of the truck.

This new controller is of the metal drum, continuous torque type, providing three speeds both forward and reverse, and is interlocked with the brake through a magnetic blowout, mill-type contactor in such a manner that when the operator steps off the truck the circuit is broken and the brake set. The circuit can be closed again for truck operation only by releasing the brake with the controller in a certain position, thus requiring a conscious and sustained action by the operator to put the truck in motion. This safety interlock prevents the truck from being started accidentally and eliminates the possibility of damage by meddlers.

The "NoPlug" controller is made by the Baker-Raulang Co., Cleveland, Ohio.

Monarch Machine Tool Co. will move its New York office to 1060 Broad Street, Newark, on May 1.

Busch-Lawrence, Inc., 1012 Elm Street, Cincinnati, has been formed to sell materials-handling equipment.

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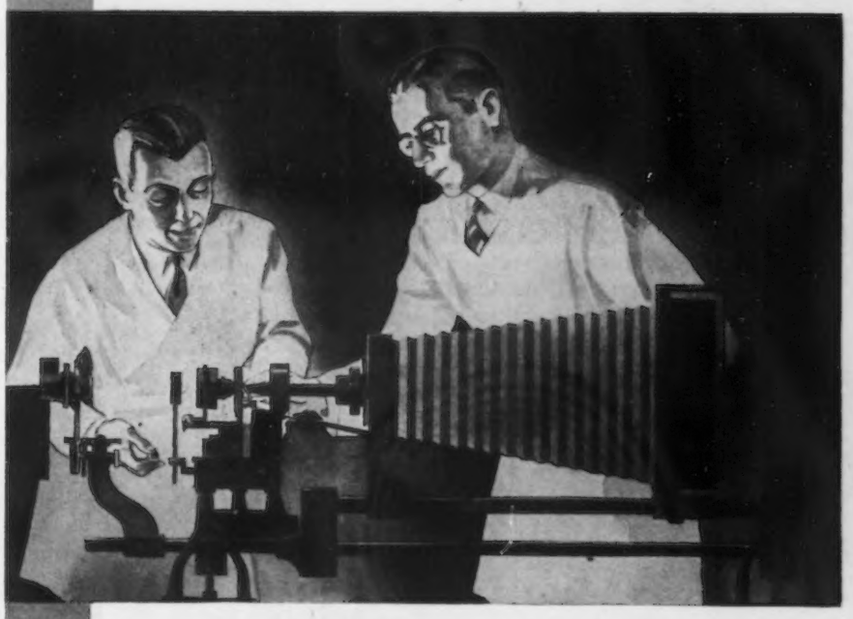

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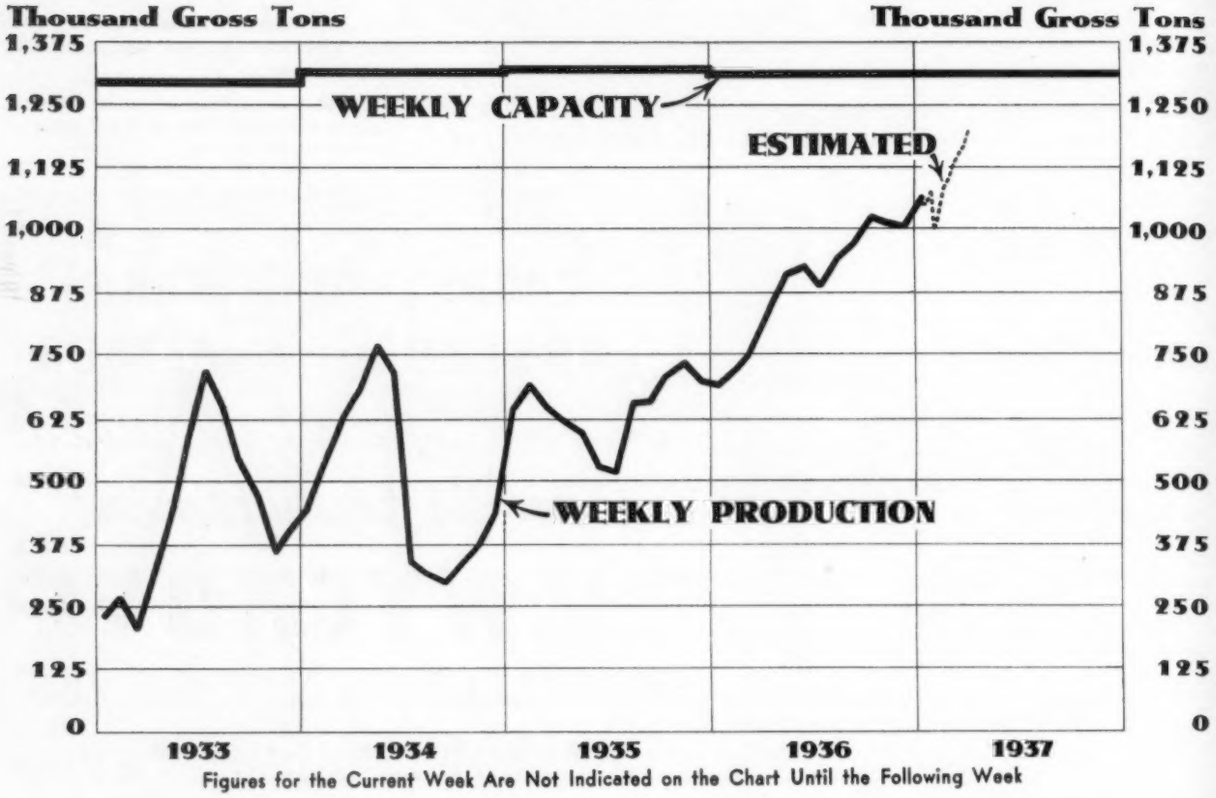
General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting, Turned and Ground Shafting
Wide Flats up to 12" x 2"

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week
Pittsburgh	94.0	94.0
Chicago	84.5	83.5
Valleys	88.0	88.0
Philadelphia	67.0	68.0
Cleveland	75.0	78.0
Buffalo	90.0	92.0
Wheeling	99.0	99.0
Southern	77.5	77.5
Ohio River	90.0	87.0
Western	91.5	91.5
St. Louis	88.0	88.0
Detroit	100.0	100.0
Eastern	93.0	93.0
Aggregate	91.0	91.0

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended				Year to Date	
	April 6, 1937	Mar. 30, 1937	Mar. 9, 1937	April 7, 1936	1937	1936
Fabricated structural steel awards	36,650	35,550	23,100	14,850	360,245	302,615
Fabricated plate awards	2,755	12,270	2,130	12,400	51,030	97,365
Steel sheet piling awards	0	275	0	300	14,930	15,205
Reinforcing bar awards	7,265	2,985	710	4,700	49,320	123,255
Total Lettings of Construction Steel	46,670	51,080	25,940	32,250	475,525	538,440

. . . SUMMARY OF THE WEEK. . . .

. . . First quarter steel production breaks all records for that period.

° ° °

. . . Second quarter output virtually sold out; large pipe line order placed.

° ° °

. . . Tin plate advanced 50c. a base box; scrap markets develop easier tone.

HAVING broken all first-quarter records in production, the steel industry holds to its high pace, with no important let-down in sight. First-quarter output of open-hearth and bessemer ingots, at 14,390,787 gross tons, was almost 3.5 per cent above the total for the first quarter of 1929 and was exceeded in only one quarter of that year, the second, when production totaled 15,139,254 tons. Moreover, the March total of 5,229,431 tons makes that month the highest March on record.

March output of coke pig iron was 3,459,473 gross tons, or a daily rate of 111,596 tons, which was 4.2 per cent over the daily rate of 107,115 tons in February. On April 1 there were 182 furnaces making iron, producing at a rate of 112,970 tons a day, against 176 on March 1, producing 108,720 tons a day. There was a gain of six furnaces in the month, and others are now being made ready for operation.

This week's steel production rate is estimated at 91 per cent, unchanged from last week. Official and unofficial weekly estimates published in March fell below the actual rate for the month, which, as calculated by the American Iron and Steel Institute, was 90.13 per cent. Except for such checks as may be caused by the necessity for equipment repairs and raw material shortages, the present rate is likely to continue or possibly go higher. Within a week or so the Carnegie-Illinois Steel Corp. will start up its No. 2 open-hearth plant at Gary, which has been idle since 1930, thereby adding to the Chicago district rate, which has risen a point this week to 84½ per cent. This and a gain in the southern Ohio district to 90 per cent offset slight losses at Cleveland, Buffalo and in eastern Pennsylvania.

IN the first few days of April new business has declined moderately from the brisk pace of March, which was to be expected, as many outstanding price protections on identified construction projects expired March 31 and the sold-up condition of the mills for second quarter precludes the placing of much additional business for this period. Some mills are more active in soliciting orders for third quarter, particularly in sheets and strip, but the solicitation takes the form of allocation of tonnage to regular customers at prices in effect at time of shipment.

The steel industry and its customers do not appear to be greatly disturbed over President Roosevelt's attack on steel prices except as to its unfairness, in view of the fact that present prices have been brought about largely by the policies of the administration, especially the 40-hr. week provision of the Walsh-Healey Act. Withdrawal of Government spending for various projects would be welcomed if it were to mean a genuine reduction in total Government expenditures. Moreover, the amount of steel that has been taken for PWA and WPA projects is probably exaggerated in the minds of Washington officialdom.

Steel needs of private industry in construction work have been for some time in excess of Government-sponsored projects. It is estimated that not more than 5 per cent of present steel production is for Government work. The Panhandle Eastern Pipe Line Co. has placed 65,000 tons of 18 to 24-in. fabricated steel pipe, divided 60-40 between National Tube Co. and A. O. Smith Corp., and another pipe line project of larger size is in the making. Great Lakes Steel Corp., Detroit, National Steel subsidiary, has ordered 18,000 tons of fabricated structural steel from Bethlehem Steel Corp. for a new mill building. Railroad equipment buying is taking on new life. The Pennsylvania Railroad will require upward of 25,000 tons of steel for 2500 cars it will build in its own shops. The Soo Line has ordered 550 cars and the Union Pacific is inquiring for 750 to 3000. The Santa Fe is also developing a large program. The Atlantic Coast Line has ordered 12 locomotives.

If the steel were available, American producers could easily book a large volume of export business at prices higher than domestic quotations. Much of this demand cannot be satisfied by European mills and will be a cushion for American mills if it should still be available when domestic demand has eased. Despite the shortage of pig iron here, large export inquiries for that product also are seeking suppliers. One New York company has a total of 76,000 tons to place, including 4000 tons for Czechoslovakia. Domestic production of merchant iron for the second quarter is virtually sold out, and a large re-order demand has appeared at Chicago from melters who underestimated their requirements.

TIN plate, the only major product that was not included in price rises announced in March, has been advanced 50c. a base box, effective at once, by Carnegie-Illinois Steel Corp. The new prices are $5.35, Pittsburgh, and $5.45, Gary, plus transportation charges. Special coated manufacturing ternes were advanced to $4.65 per base box, Pittsburgh, and $4.75, Gary.

Further additions to steel manufacturing costs are seen in the wage agreement reached between the soft coal operators and the mine workers, which adds 50c. a day to wages plus time and a half for overtime exceeding 35 hr. a week. Estimates of increased costs vary from 15c. to 25c. a ton. Connellsville foundry coke has been advanced 50c. a ton to $4.75, minimum, and furnace

coke is also likely to go higher, thereby raising pig iron costs. By-product foundry coke has been increased 75c. a ton in all important districts.

Scrap markets, which are highly sensitive, are weaker in some districts, presumably having been affected somewhat by the President's statement regarding steel prices. A decline of 50c. a ton occurred at Pittsburgh, but the Philadelphia price rose the same amount, leaving THE IRON AGE scrap composite unchanged at $21.92. THE IRON AGE finished steel composite does not include tin plate, and therefore is unchanged.

. . . PITTSBURGH . . .

. . . Heavy production continues, with pressure for deliveries unabated.

o o o

. . . Much needed repairs on steel-making equipment being undertaken.

o o o

. . . Large orders for pipe line, steel mill building and railroad cars.

PITTSBURGH, April 6. — The upward surge in ingot output in the Pittsburgh district has stopped for the time being at least and operations this week are unchanged at 94 per cent of capacity. The Wheeling district is unchanged at 99 per cent of capacity.

Heavy production for several months has made it necessary that much needed repairs on steel-making equipment be undertaken at once. Difficulties at the mills in setting up rolling mill schedules and attempting to make prompt shipment are comparable to those encountered several years ago. Nevertheless, increasing pressure for delivery is reaching producers daily; yet with a better-than-expected volume of fresh business, little headway is being made in paring down backlogs.

Demand for sheets continues unabated, and most orders now being received will bring the price at the time of shipment. Bar specifications and strip bookings are in fair volume considering the substantial tonnages ordered before the price advance. Heavy materials are receiving support from a number of privately financed projects involving plant and factory extensions.

Bethlehem Steel Corp. was awarded the contract for 18,000 tons of plates and shapes for strip mill buildings at Great Lakes Steel Corp., Detroit. Pennsylvania Railroad will build 2500 cars in its own shops and the Soo Line has ordered 550 freight cars. Panhandle Eastern Pipe Line Co. placed an order for 65,000 tons of line pipe, 60 per cent of which will be seamless and made by National Tube Co., while the remainder went to A. O. Smith Corp. and will be welded pipe.

Tin plate operations are unchanged at 100 per cent and most producers have all the business they can take care of up to the end of September. The leading producer has advanced 50c. a base box effective immediately.

The scrap market is a little softer, having leveled off 50c. a ton in the past week.

Owing to increases in soft coal miners' pay, higher prices for coal and coke are expected as soon as actual cost increases are determined.

Pig Iron

Not all consumers have placed orders for their second quarter requirements, notwithstanding the fact that supplies are exceptionally tight. Stocks at producers' plants have been depleted further owing to demand being heavier than actual production. Pig iron yield was affected some last week owing to the "holiday" at beehive coke plants since some producers were unable to obtain enough coke for full operations.

Semi-Finished Steel

Specifications for semi-finished steel are in excellent volume and there are no indications of a falling off in demand. Many customers have been unable to obtain as much steel as they desire. There is little doubt that this month will see further alloting of tonnages since integrated mills are in dire need of material for their own use.

Bolts, Nuts and Rivets

Fresh business is light in view of the heavy forward buying last month. Production, however, is being maintained at practical capacity with a wide diversification in shipments. Fabricating shops are taking a fair volume of steel and there has been no noticeable let-down in specifications from car builders. Shipments to automobile manufacturers unaffected by labor troubles are steady and a further pick-up is expected if and when the present sit-down hysteria comes to an end.

Bars

Although considerable forward buying evidently took place in the early part of March, it is becoming increasingly apparent that users underestimated their actual needs. Fresh business is in fair volume and there is a growing conviction that most customers are more worried about delivery than any other factor. Because of this, they are taking no chances and are at least getting on the order books. To make the situation more confusing, there continues to be constant pressure from a great variety of consumers for more prompt delivery, signifying that no undue stocks are being built up. Acute shortage of steel will in most cases prevent present backlogs from being reduced rapidly.

Cold-Finished Bars

Unfilled tonnage runs from 10 to 12 weeks, depending on the grade, and with new business being almost equal to shipments, there is little chance that backlogs will be cut down over the next 30 days. The volume of bookings at second quarter prices has been much greater than producers had expected. Some producers are accepting this as evidence that the forward buying movement was not as great as had been expected. Meanwhile, shipments are exceptionally heavy to automobile manufacturers, and jobbers are running a close second. The latter business has increased by leaps and bounds as most mills have been unable to take care of small orders and still give the service desired by customers.

Reinforcing Bars

Concrete bar awards in the past week were a little more plentiful. National Milling Co. contracted for approximately 900 tons of rail steel reinforcing bars, 300 of which is for a factory building in Toledo and 600 tons for a grain elevator

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Apr. 6, 1937	Mar. 30, 1937	Mar. 9, 1937	Apr. 7, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$36.37½
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	28.00
Slabs, Pittsburgh	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	1.85
Bars, Chicago	2.50	2.50	2.50	1.90
Bars, Cleveland	2.50	2.50	2.50	1.90
Bars, New York	2.78	2.78	2.78	2.20
Plates, Pittsburgh	2.25	2.25	2.25	1.80
Plates, Chicago	2.30	2.30	2.30	1.85
Plates, New York	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago	2.30	2.30	2.30	1.85
Structural shapes, New York	2.5025	2.5025	2.5025	2.06¼
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.10
Hot-rolled strips, Pittsburgh	2.40	2.40	2.40	1.85
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh	2.75	2.75	2.75	2.10
Wire nails, Ch'go dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh	**$5.35**	$4.85	$4.85	$5.25

Pig Iron

Per Gross Ton:	Apr. 6, 1937	Mar. 30, 1937	Mar. 9, 1937	Apr. 7, 1936
No. 2, fdy., Philadelphia	$25.76	$25.76	$25.76	$21.3132
No. 2, Valley furnace	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti	23.69	23.69	23.69	20.2007
No. 2, Birmingham†	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	20.8132
Basic, Valley furnace	23.50	23.50	23.50	19.00
Malleable, Chicago*	24.00	24.00	24.00	19.50
Malleable, Valley	24.00	24.00	24.00	19.50
L .S. charcoal, Chicago	30.04	30.04	29.54	25.2528
Ferromanganese, seab'd, carlots	95.00	95.00	80.00	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$23.25*	$23.75	$23.25	$15.75
Heavy melting steel, Phila.	**20.75**	20.25	19.75	13.75
Heavy melting steel, Ch'go	21.75	21.75	20.25	14.25
Carwheels, Chicago	21.25	21.25	19.50	14.00
Carwheels, Philadelphia	**21.75**	20.00	18.50	14.75
No. 1 cast, Pittsburgh	20.25	20.25	19.25	15.25
No. 1 cast, Philadelphia	**22.75**	22.25	19.75	14.25
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.00	12.50
No. 1 RR. wrot., Phila.	**20.50**	20.00	18.75	13.25
No. 1 RR. wrot., Ch'go (net)	19.00	19.00	18.50	13.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.25	$4.25	$4.25	$3.65
Foundry coke, prompt	**4.75**	4.50	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	*16.00*	16.25	16.25	9.25
Lake copper, New York	*16.12½*	16.37½	16.37½	9.37½
Tin (Straits), New York	*61.87½*	65.25	63.50	47.25
Zinc, East St. Louis	7.50	7.50	7.50	4.90
Zinc, New York	7.85	7.85	7.85	5.27½
Lead, St. Louis	*6.75*	6.80	7.35	4.45
Lead, New York	*6.90*	6.95	7.50	4.60
Antimony (Asiatic), N. Y.	17.00	17.00	16.75	13.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
April 6, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$21.92 a Gross Ton
One week ago	2.605c.	23.25	21.92
One month ago	2.605c.	23.25	21.08
One year ago	2.097c.	18.84	14.58

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1937	2.605c., Mar. 9	2.330c., Mar. 2
1936	2.330c., Dec. 28	2.084c., Mar. 10
1935	2.130c., Oct. 1	2.124c., Jan. 8
1934	2.199c., April 24	2.008c., Jan. 2
1933	2.015c., Oct. 3	1.867c., April 18
1932	1.977c., Oct. 4	1.926c., Feb. 2
1931	2.037c., Jan. 13	1.945c., Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29
1928	2.286c., Dec. 11	2.217c., July 17
1927	2.402c., Jan. 4	2.212c., Nov. 1

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1937	$23.25, Mar. 9	$20.25, Feb. 16
1936	19.73, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24
1927	19.71, Jan. 4	17.54, Nov. 1

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1937	$21.92, Mar. 30	$17.92, Jan. 4
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, April 23
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 2
1927	15.25, Jan. 11	13.08, Nov. 22

at Milwaukee. Sheffield Steel Corp. was awarded a contract for 850 tons of billet steel reinforcing bars for a water supply system at Omaha, Neb. Concrete Engineering Co. is furnishing 860 tons of concrete bars for an Armour & Co. building at Omaha, Neb. Producers for the most part are expending all their effort in getting out the heavy tonnage now on the books.

Plates and Shapes

Privately financed projects continue to increase at a faster rate than Government financed jobs. This week's awards included a considerable number of plant and factory additions. American Bridge Co. will fabricate 200 tons of plates and shapes for a garage and store addition for the Dayton Co., Minneapolis, while the same company will furnish 450 tons of material for power station alterations for the Pennsylvania Electric Co. at Seward, Pa. The steel industry itself is giving impetus to plate and shape business with approximately 18,000 tons for strip mill buildings at the Great Lakes Steel Corp., Detroit, going to Bethlehem Steel Co. Although there has been some talk of projects being canceled because of higher prices, this has not been the case as yet with respect to factory and plant additions. Some publicly financed jobs, the bids on which were above appropriations, have been postponed and in one or two cases the jobs will be readvertised after changes are made. Ingalls Iron Works has been awarded a contract for eight oil barges for the U. S. Engineers' office at St. Louis, involving 1200 tons of plates.

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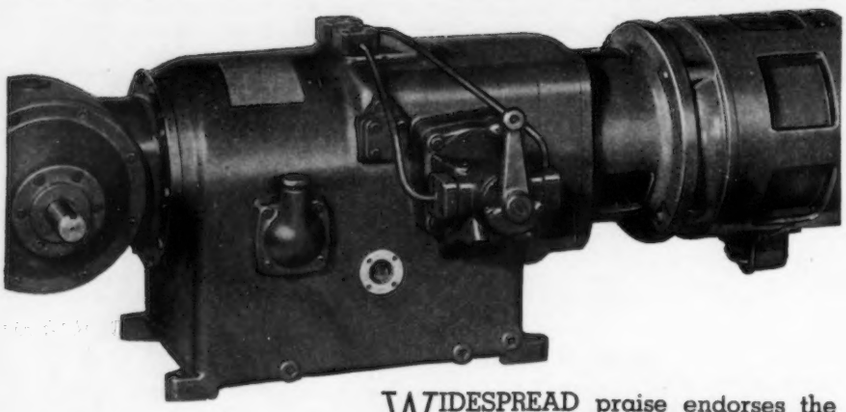

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Railroad Buying

Pennsylvania Railroad, after receiving bids on 2500 cars, has announced that it will build 1500 box and 1000 gondola cars in its own shops. There is a chance that this program may be increased. The Soo has ordered 450 freight cars from the Pullman Standard Car Mfg. Co. and 100 from the American Car & Foundry. Norfolk & Western has placed an order for nine postal cars with Bethlehem Steel Corp.

Sheets

With deliveries becoming worse instead of better, sheet specifications continue in excess of shipments. A considerable number of fill-in orders are being received from refrigerator manufacturers. Jobber buying is good and movement to automobile companies is heavy. For some weeks, most orders have been accepted on the basis of price at the time of shipment. Many customers are taking no chances on missing out on delivery and no matter how far ahead promises are given, they are getting on the order books. Meanwhile, a large number of small miscellaneous customers are obtaining their supplies through jobbers whose business is going along at a fast rate. A good volume of present tonnage is being taken by barrel manufacturers and office furniture makers.

Strip

Aggregate specifications are slightly ahead of a week ago. Producers' attention is centered on clearing mills of low-priced tonnage, and, as a result, production is at virtual capacity. Backlogs on hot rolled strip are about six weeks with cold rolled being promised in nine. There is a wide diversification in the type of orders being placed on the books. A considerable tonnage is being taken by business machine manufacturers. The tendencies of a few smaller

companies to let up on their demand has been overshadowed by increases from other sources.

Tubular Products

Pandhandle Eastern Pipe Line Co. has placed an order for approximately 65,000 tons of 18-in., 20-in., 22-in. and 24-in. pipe, 60 per cent of which will be fabricated by National Tube Co., with the remainder being made by A. O. Smith Corp. The total order approximates about 285 miles and will undoubtedly be used for loops. A few large line pipe projects are expected to be announced in the near future. Pipe production is at a high level with producers attempting to clear the mills of orders taken previous to the pipe increase. No falling off in pipe production is expected for some time since most mills must replenish not only their own stocks but those of jobbers which have been greatly depleted within the past few weeks.

Wire Products

Demand for wire rods and manufacturers' wire is greater than the supply. Some mills are turning down orders and are keeping a close watch on their production schedules in order that no large build-ups will materialize. Furthermore, the question of steel shortage is constantly being faced by producers. Merchant wire items are in fair demand and foreign inquiries continue to make their appearance. Although no definite information is available at this time there is a possibility that further price adjustments may be made on wire products before the end of the quarter.

Tin Plate

The leading producer has announced a 50c. per base box advance in tin plate and manufacturing ternes, effective immediately. Practically all tin plate consumers are covered on their requirements at previous prices until the end of September. When the price was announced last fall, mills had no inkling of the tremendous increase in raw material and labor costs. Meanwhile most producers are unable to accept any more business at the present time and all contracts are being scrutinized in order to prevent the ordering of more than usual requirements. Operations continue at 100 per cent of capacity.

Coal and Coke

Briefly, the new wage contract between the union and coal operators calls for a 50c. a day increase for those miners who previously made $5.50 a day and approximately 10 per cent increase for all other workers. An added feature which will have its effect on the cost of coal is the addition of time and a half for all overtime over 7 hr. a day or over 35 hr. a week on those jobs for which this work schedule is standard. Meanwhile, coal producers have not yet figured out the increased cost in the production of coal, although it is expected that definite information along this line will be available some time this week. Estimates vary from 15c. to 25c. a ton. It is a foregone conclusion that beehive furnace and foundry coke prices will be revised upward as soon as the increased cost in manufacture has been determined. A further tightness took place in the coke market last week owing to the miners' "holiday" and some blast furnaces were obliged to slow up operations. Beehive foundry coke, f.o.b. Connellsville, is advanced 25c. a ton to $4.75. Higher prices are expected next week as soon as the details of the miners' agreement have been digested.

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. . . . CHICAGO . . . .

. . . Ingot rate goes higher, to 84½ per cent of district's capacity.

o o o

. . . Shortage of raw steel is handicapping mills in adding to output.

o o o

. . . Pig iron demand active notwithstanding recent large coverages.

CHICAGO, April 6.—Pressure for iron and steel deliveries is no less acute and Chicago mills are straining to bring into use every piece of equipment. The ingot rate now stands at 84½ per cent of capacity, up one point from a week ago, and a further rise about the middle of the month will come when Carnegie-Illinois brings in its No. 2 open hearth plant at Gary, where another blast furnace is being fired.

As difficult to handle as is consumer demand for finished steel, there is the more urgent, and for that matter the more serious demand for raw steel. Mills have attempted to trade raw steel among themselves but without avail. Although Chicago mills are well supplied with coke-making capacity, there are units in the country which are not so well contained and such mills are having difficulty with coke supplies because of strikes and flood rebuilding operations at independent coke plants. The matter of ore supplies is of growing concern and railroad officials are counting on shipping 3,000,000 tons by all-rail movement from Superior, Wis., to Chicago mills.

Pig Iron

Notwithstanding exceptionally heavy commitments for second quarter delivery, there are daily sales of good quantities. The reason for this lies in the fact that many consumers thought they were looking ahead by overbuying for the first quarter. However, their business has been so much better than expected that in many cases their anticipated carryover in stock has been highly disappointing. Releases so far in April are outrunning the average in March, and both foundries and sellers of pig iron see April as a new peak month for the year. A slight flurry in scrap prices has not had effect in the pig iron market either as to unsettled prices or a check on shipments.

Reinforcing Bars

Road and bridge projects are taking a more prominent part in the market. Illinois has placed 630 tons and Wisconsin and Indiana will purchase upward to 600 tons each in the early part of April. Other than a 750-ton letting for a store, the market is quiet, a natural after-effect of the rush of pre-price advance protection agreements. New prices are untested on large tonnages, but schedules are reasonably steady on small lots. Shop operations are expanding, several units having added second shifts.

Warehouse Business

March sales topped those of February, and the indications are that April business will fall back, all of which is according to precedent. Local conditions such as floods, strikes, etc., have had much to do with spotty movement in some territories which normally keep abreast of the March peak.

Wire Products

Mills are accepting new business but they are apportioning tonnages and using care to avoid top-heavy books which would result in a large carryover into the third quarter. Prices are stable, including quotations on nails, for which the spring outlook is exceptionally good. Mill stocks are unusually low and assortments cannot be appraised at better than fair. The prospects for enlarging stocks or improving the delivery situation are poor because of the serious shortage of raw steel. Business in agricultural areas is growing notwithstanding a few bad spots where farmers are handicapped by lack of funds and credit. Producers report second quarter books the largest since 1929.

Sheets

Deliveries now extend well into August, and there is little lessening of the pressure buyers are exerting against mills. The point has now been reached where sellers are carefully picking tonnages which they will accept for third quarter delivery at prices to be determined for that period.

Structural Material

Mills are well engaged and new inquiries present a far better picture than was in evidence a week ago. Several industrial developments in Chicago are impressive, and most Middle Western States have bridge programs. From nearby cities come inquiries for large buildings, a notable one being at St. Louis, where a structure calls for 4600 tons. A refinery project at Dallas, Tex., will take 2000 tons. Figures were taken Monday on another of the Mississippi River dams.

Plates

Chicago mills will produce about 26,000 tons of plates to be rolled for a 65,000-ton pipe line ordered by the Panhandle Eastern Pipe Line Co. Substantial releases are coming from structural fabricators, and railroad equipment use of plates is exceptionally heavy. The Union Pacific is in the market for cars and the Soo Line has ordered 100 ballast cars from American Car & Foundry Co. The Santa Fe is developing a large program for 1937.

Bars

All classifications of bars users are doing well and mills are apportioning tonnages in order to satisfy production requirements. Orders for farm equipment and tractors are accumulating and nothing can be done about the situation because production is now and has been at plant capacity. Second quarter books are all but filled and orders for the current period are being carefully chosen.

Rails

Premiums are being offered by foreign buyers but they are enticing no shipments from the Chicago area. Local rail mills are busy and backlogs are ample for several months of near-capacity output. The Santa Fe is planning to relay 200 miles of track and other like projects are developing. Accessory departments are busy matching the requirements of rail shipments. Spot sales of track supplies are in good volume considering the size of contracts.

..GREAT BRITAIN..

. . . Mills sold up, accepting little new business.

o o o

. . . Raw material shortage is curtailing output.

LONDON, April 6 (By Cable)—Business in iron and steel is small as producers are having difficulty in executing old contracts, and are quite unable to accept new business except for second half-year. Moreover, a price revision is imminent, and most consumers are avoiding forward commitments pending a clearer outlook. More plants are being prepared, but the raw material shortage may prevent their operation. Actually, since the beginning of the year a curtailment of steel output has been necessary, and, with imports also lower, a tight squeeze during the coming months is likely.

Pig iron consumers are obtaining only their urgent needs. Overseas buyers are offering prices considerably higher than home values, but there is little response, and most shipments are under old contracts.

Rerollers are seriously affected by the lack of semi-finished steel, and several sheet works are operating only intermittently, although the demand for black and galvanized sheets is heavy.

The demand for heavy steel far exceeds the supply. There is fair business in tin plate, but, owing to the steel shortage, the permitted output of 75 per cent of capacity is not nearly attained. The tin plate cartel meets in Venice on Tuesday, and an increase in official prices is expected.

Export releases of Continental iron and steel are increasing, but are still inadequate, and semi-finished steel is still unobtainable.

British prices are unchanged. Continental billets are now £3, 7s. gold and sheet bars are £3, 8s. gold.

..BIRMINGHAM..

. . . Mills and furnaces running at top speed.

o o o

. . . Order books heavy into July.

BIRMINGHAM, April 6.—The 500 box cars recently ordered by the Central of Georgia Railroad will be built at the Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co., at a cost of approximately $1,175,000. Deliveries are to be made in July and August. Additional car business is in prospect for the plant as inquiries have been sent out by Southern Railway, Atlantic Coast Line and Seaboard Air Line.

Steel mills and blast furnaces continue to produce at high speed to meet the demands of customers for deliveries. Specifications for most standard products are still far in excess of production and shipments. Most mill units are being pushed to their maximum capacities. For the second successive week there has been a heavier flow of specifications for bars, plates and shapes. At times the mills are prorating tonnage when needs are more than can be immediately supplied.

As in other districts, the order books of Birmingham steel and iron producers are overloaded and it will be months before present backlogs can be cleared up. For some products, the mills have tonnage that will reach not only through this quarter but into July.

Naturally, in the face of such conditions, production is unchanged; 16 blast furnaces and 18 open hearths were worked last week and the same number is scheduled for this week.

Coke demand and scrap demand have been greatly stimulated by the iron and steel activity. There is an actual shortage of coke in the district, since furnace requirements have been stepped up so sharply. Stocks of scrap dealers have been declining steadily, as shipments far exceed receipts.

On Tuesday and Wednesday of this week stockholders of the Gulf States Steel Co. will hold special meetings to ratify plans for the sale of the company to the Republic Steel Corp. and for the distribution of assets of the company.

CANADA

. . . Business continues at an active pace.

o o o

. . . Canadian Pacific buys 29,590 tons of rails.

TORONTO — Demand for iron and steel and their products continues active in the Canadian markets, and producers are booking orders at a good rate. Additional rail and car orders are announced by the Canadian Pacific. The rail order totaling 29,590 tons consisted of 14,200 tons of 100-lb. rails and 8710 tons of 80-lb. rails, which were awarded to the Algoma Steel Corp., Sault Ste. Marie, Ont., and 6680 tons of 100-lb. rails to the Dominion Steel & Coal Corp., Sydney, N. S. Steel mills now are well supplied with orders, and it is stated that they will be in a position to maintain capacity operations for several months. Mills are said to be running behind in deliveries of sheets as well as on some other materials. The British Government is placing orders in Canada for munitions, etc., and good business has been built up in the export markets.

Recent advance in prices has stimulated sales of merchant pig iron and demand also has increased as a result of the shortage of scrap. Pig iron sales are running better than 2000 tons a week, and many melters have covered for second-quarter needs by contract. Prices are firm at levels recently announced.

Trading in iron and steel scrap is fairly brisk. Dealers continue to have difficulty in supplying demands and, despite the sharp increase in offering prices, comparatively little material is being thrown on the market. Mills are taking all the heavy melting and other steel grades offered and are pushing dealers for larger tonnages. Prices are firm and unchanged.

The Bureau of Supplies and Accounts, Navy Department, will open bids on April 16 for 291 tons annealed cold rolled steel sheets for delivery at the Norfolk, Va., Navy Yard. The material is to be used for the manufacture of practice bombs.

. . PHILADELPHIA . .

. . . Demand has not yet lessened appreciably.

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. . . First quarter bookings are double those of same period last year.

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. . . Operations decline one point to 67 per cent of capacity.

PHILADELPHIA, April 6.—Few sales offices are noticing a let-up in demand this week, although one or two report that orders are being received in slightly less volume. Deliveries are unimproved, and sellers are being subjected to intense pressure from buyers for the inclusion of their orders on mill schedules. Many thousands of tons have been turned down in the various sales offices here, and, in the light of this fact, it would be interesting to know just where this business has been placed, if at all, since all sellers, whether forced to do so against their will by extended deliveries, or whether done deliberately in an effort to keep their schedules as clear as possible, have turned many customers away.

Some mills could easily obtain premiums ranging from $1 to $4 a ton for deliveries in one to four weeks ($1 per week) but are generally declining such inducements because of loyalty to regular customers and also because such transactions might be considered as a violation of the Robinson-Patman Act.

Sales offices, in looking over their first quarter records find, almost without exception, that bookings during that period were about double those of the first quarter last year. Second quarter bookings this year are not expected to equal the orders taken in the like period of 1936.

The consensus of opinion on last week's remarks by the President concerning the prices of steel and other materials, which have since been widely discussed by interested parties in this area, is that his informant erred in his presentation of the facts to the Chief Executive.

Steel mill activity has been reduced one point to 67 per cent of capacity, as one furnace was taken off because of decreased produc-

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tion on account of Walsh-Healey Act requirements. Extra turns may soon be necessary at this particular mill, however, and it is believed that a force of new men may be broken in some time during the next month.

Pig Iron

There has been some recent buying for second quarter shipment, but almost everything available has already been sold, and a quiet month is expected by most sellers. Shipments are running heavy and are estimated to be about double those of this time last year. It is reported that some foundries that were fortunate enough to secure good-sized quantities of iron before the recent price advances are holding this low-priced iron in their stock piles against the day when the supply so tightens that they will be forced to rely upon their reserves. It is not believed, however, that speculative buying in its true sense is being commonly practiced in this district. The fact that sellers for export are still able to obtain premiums has led some to predict another increase in the domestic price if users here are going to be able to keep iron in this country. That this is not necessarily so, however, is shown by the fact that more than one producer has voluntarily withdrawn from the export market in spite of the prices being offered in order to take care of the regular trade upon which they depend in good times and bad.

Plates and Sheets

The congested condition in flat-rolled products has not eased, and plates have become worse this week with the clearing up of practically all of the Pennsylvania's requirements. With the exception of this work, most makers are now occupied with tonnage taken at the second quarter price. Although some mills are not quoting except to regular customers, these alone seem able to provide more business than is desired. Baldwin Locomotive Works has booked 12 engines for the Atlantic Coast Line. It was learned today that the Pennsylvania will build in its own shops the 2500 cars for which bids were asked recently. Sellers are anxiously waiting to learn if an award will finally be made for the construction of the United States Lines vessel, upon which bids were taken last week in Washington. Sheets are being promised as far ahead as 23 weeks, but mills that can give quicker shipment are refusing to accept the orders with which they are being flooded by buyers, notwithstanding enticing offers of premiums, so that they will be in shape to supply their steady customers as soon as possible.

Structural Shapes and Reinforcing Bars

Few awards were reported this week, one of 267 tons to Dietrich Brothers, Baltimore, for a hospital addition and nurses' home at Wilmington being the largest. Phoenix Bridge Co. was awarded 175 tons of I-beams for a Reading Railroad bridge near Coatesville; an airplane hangar requiring 150 tons, for the National Guard in Philadelphia, went to the Anthracite Bridge Co., Scranton, while Belmont Iron Works secured the contract for 175 tons of furnace steel for the Bridgeton, N. J., plant of Owens-Illinois Glass Co. A store at Allentown, Pa., requiring 200 tons of bars went to Bethlehem Steel Co. Reinforcing tonnage for the foundations of the Philadelphia schools was not so great as was at first believed, although the superstructure will make use of a fair tonnage of bars. There is little construction work being done in this area at present.

Imports

The following iron and steel imports were received here during the past week: 4000 tons of chrome ore from British India; 30 tons of ferromanganese from Norway; 5 tons of steel bands and 8 tons of structural shapes from France; 94 tons of steel bands, 176 tons of steel bars, and 118 tons of structural shapes from Belgium.

. . . Steel plant operations at undiminished rate.

BUFFALO, April 6.—The Buffalo sewer authority will ask for bids on a pumping station in South Buffalo to require 130 tons of reinforcing bars and a lesser amount of fabricated structural. In addition to this several hundreds of reinforcing bars will be required for new divisions of the sewer system.

A new cancer hospital in Buffalo authorized by the State Legislature will require, it is estimated, 500 tons of structural steel. A Glens Falls concern is the general contractor for Port Byron School, requiring 350 tons of structural steel.

Buffalo district open hearth operation is as follows: Bethlehem's Lackawanna plant, 29; Republic Steel Corp., seven; Wickwire-Spencer Steel Co., three.

. . . District operations at 90 per cent of capacity.

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. . . By-product foundry coke up 75c. a ton.

CINCINNATI, April 6—In keeping with the general trend, sheet steel demand in this area is exceptionally heavy. The leading district interest reports full books for second quarter, with substantial ordering for third quarter at whatever prices are then prevailing. In fact, isolated instances of consumers asking for fourth-quarter space on rolling schedules are reported. Current business is in profitable mixture and single orders specify larger quantities than heretofore. All mills are now at full capacity operations, traces of flood damage having been fully erased. Shipments are reaching record heights. The Middletown unit of American Rolling Mill reports shipments in March to have been 16,000 tons greater than any month in the company's history.

Ingot steel output has returned to pre-flood levels. Production is up a few points to about 90 per cent of capacity. Thirty open hearths out of 34 are producing. Further increase to supply exceptional rolling needs is predicted.

Pig iron consumers are still pressing for delivery on current commitments, but new business is not large. Shipments, of course, are heavy.

Warehouse business in March was substantially greater than during the same month a year ago. Comparison with January and February, of course, reflects increase over these months, since flood conditions hampered business during the early part of the quarter.

Shipments of foundry coke are heavy as users seek to increase stocks depleted during the flood suspension. By-product foundry coke is up 75c. a ton, the Cincinnati delivered price being $10.50.

. . . CLEVELAND . . .

. . . Ingot output declines three points in Cleveland-Lorain district.

o o o

. . . Buyers showing a little less anxiety to get orders on mill books.

o o o

. . . However, backlogs offer little or no open space in second quarter.

CLEVELAND, April 6.—Ingot output in the Cleveland-Lorain district dropped three points to 75 per cent of capacity this week. In the Youngstown district it is unchanged at 88 per cent of capacity.

Consumers are showing a little less anxiety to get under cover with orders for finished steel than during the past few weeks, and the tonnage booked has declined slightly, particularly in sheets and strip. This is not surprising because most consumers have covered for rather extended requirements, and deliveries of much of this steel cannot be made until the third quarter. However, the volume of business continues fairly heavy and, with finishing mills operating at near capacity, there is as yet no noticeable improvement in deliveries.

March sales by the Cleveland office of one of the leading steel companies broke all previous records for the month with one exception. Some steel buyers are trying to place additional orders for sheets for the second quarter but without success. Some mills can take a little tonnage in hot rolled strip for June delivery, others are now entirely sold up on plates for the quarter and are getting well filled up with shape orders. There are indications that there has been some speculative buying or that certain consumers have contracted for steel for rather extended requirements. With heavy commitments before the price advances, new demand from railroads for steel and track accessories is light.

With the heavy influx of pig iron specifications at the end of March, some of the merchant blast furnaces will not get their low-price orders filled until about May 1.

Steel-making scrap has declined 50c. a ton, but brokers feel that the price reaction is only temporary.

Bars, Plates and Shapes

New demand for bars continues good, and mill deliveries ranging from four to six weeks are unchanged. Some consumers are crowding mills for shipments. Reinforcing bars are quiet. Producers have heavy backlogs in plates. The Cleveland plate mill is filled up for the second quarter and is now taking business for the third quarter subject to prices prevailing at time of shipment. Activity in the construction field has been rather limited since the price advance on structural shapes became effective, although a moderate amount of private work is coming out involving less than 100 tons. The Fort Pitt Bridge Works Co. has taken 350 tons for a Veterans' Home building at Bluffton, Ohio.

Coke

By-product foundry coke has been advanced 75c. a ton for March delivery, now being quoted at $11, Cleveland. Supply is fair, although some producers are a week behind on shipments. Production in Detroit is being interrupted by labor troubles.

Pig Iron

Furnaces are crowded with orders taken at the first-quarter prices and some will not complete shipments against these old contracts until about May 1. With the unshipped iron and that already taken in, many foundries will have quite large stocks and may not need much additional iron during the quarter. However, quite a few sales in small lots are being made at the advanced second-quarter prices. Foreign inquiry is plentiful but is not attracting much interest among Lake furnaces, although barge shipments have been proposed, a barge freight rate of $2.50 from a Lake Erie port to New York being offered, or at least $1.50 a ton less than the rail rate.

Sheets

A slight easing down in new demand for sheets is noticeable, although the volume of business continues fairly heavy. Some of the mills are turning down considerable business because, with reservations that they have made for large consumers in the automotive field, they are filled for the current quarter and are not anxious to load up with a lot of business for the third quarter, although they are taking some orders for that delivery subject to the prices prevailing at the time of shipment. Some consumers are still trying to buy for the second quarter but, being unable to find mills able to take on any more tonnage for that delivery, are making commitments to get their orders on the rolling schedules as soon as possible in the third quarter. Manufacturers of refrigerators, stoves and washing machines continue to maintain full operations and there is no decrease in the demand from these sources. Tin mill black plate is very active.

Strip Steel

The volume of new business continues good but is not quite as heavy as during recent weeks. Mill backlogs are not being reduced. Automobile parts plants are crowding mills for delivery. While most of the mills are filled up for the second quarter, a few can take on a little more tonnage for that delivery.

Bolts, Nuts and Rivets

With heavy specifications brought out by the second-quarter price advance, some of the bolt and nut makers report that they booked more business in March than during any previous month for years. Rivet manufacturers also have well-filled order books as a result of orders driven out last month by the price advance. These first-quarter specifications will keep bolt and nut plants very busy through April and rivet manufacturers for perhaps a longer period. Buyers of both lines of products have closed contracts for the second quarter at the new prices, but manufacturers do not expect to get much business at the advance during the next few weeks, although they have already made a few small lot sales at the higher prices.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which In 1935 Made 98.03 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies			
1936	Open-Hearth	Bessemer	Monthly	Weekly	Number of Weeks	Per Cent of Capacity
January	2,793,421	196,389	3,045,946	687,572	4.43	52.50
February	2,707,562	202,445	2,964,418	716,043	4.14	54.67
March	3,095,375	185,040	3,342,619	754,542	4.43	57.61
1st Quarter	8,596,358	583,874	9,352,983	719,460	13.00	54.93
April	3,565,821	304,775	3,942,254	918,940	4.29	70.16
May	3,670,401	302,092	4,046,253	913,375	4.43	69.73
June	3,578,044	334,897	3,984,845	928,868	4.29	70.92
2nd Quarter	10,814,266	941,764	11,973,352	920,319	13.01	70.26
1st 6 Months	19,410,624	1,525,638	21,326,335	819,928	26.01	62.60
July	3,525,281	326,606	3,922,731	887,496	4.42	67.76
August	3,768,832	350,560	4,195,130	946,982	4.43	72.30
September	3,782,056	303,048	4,161,108	972,221	4.28	74.23
3rd Quarter	11,076,169	980,214	12,278,969	935,184	13.13	71.40
1st 9 Months	30,486,793	2,505,852	33,605,304	858,592	39.14	65.55
October	4,144,013	317,710	4,545,001	1,025,960	4.43	78.33
November	3,928,904	329,553	4,337,412	1,011,052	4.29	77.19
December	4,045,746	304,596	4,431,645	1,002,635	4.42	76.55
4th Quarter	12,118,663	951,859	13,314,058	1,013,246	13.14	77.36
Total Year	42,605,456	3,457,711	46,919,362	897,463	52.28	68.52
1937						
January	4,357,338	291,794	4,736,697	1,069,232	4.43	*81.64
February	4,012,358	331,669	4,424,659	1,106,165	4.00	84.46
March	4,730,579	403,787	5,229,431	1,180,458	4.43	90.13
1st Quarter	13,100,275	1,027,250	14,390,787	1,119,035	12.86	85.44

*Revised.

Steel Production in January-March Breaks All First Quarter Records

PRODUCTION of steel ingots in the January-March period broke all first quarter records in the history of the steel industry. The calculated total of open-hearth and bessemer ingots, according to the monthly report of the American Iron and Steel Institute, is 14,390,787 gross tons, which compares with 13,897,020 tons in the first quarter of 1929. Moreover, the total for the past three months exceeds that of any quarter in 1929 except the second quarter and came very reasonably close to equaling that record-breaking total of 15,139,254 tons.

The total for March was 5,229,431 tons, which also was a new high record for that month, exceeding the March, 1929, total, which was 5,068,176 tons. The industry operated in March at an average of 90.13 per cent of capacity and at 85.44 per cent in the first quarter.

The structural fabricating plants in the district are said to be operating at about 50 per cent of capacity, which rate they will be able to maintain for the next five or six weeks. No new projects for private individuals or the Government are in the offing.

All records for shipment of pig iron in St. Louis were said to have been broken in March. Only a few sales were made. The melt continues at a high rate in all industries.

Ingot operations continue at better than 88 per cent of capacity.

....ST. LOUIS....

. . . March jobbing trade in large volume.

o o o

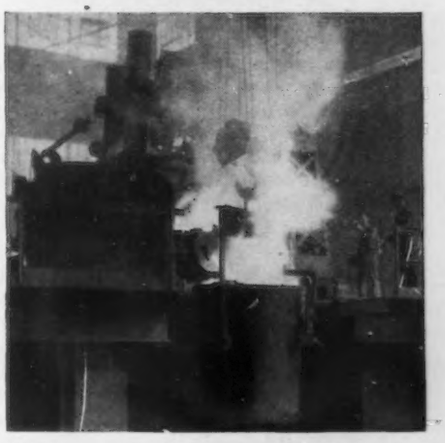
. . . Pig iron shipments a record last month.

ST. LOUIS, April 6.—Warehouse business in March is reported to have been considerably larger than in any month in the post-depression period, and from 75 to 100 per cent above March of last year. The greatest demand has been for sheets, as a result of the oversold condition of the mills.

There was a rush of specifications during the past week for structural shapes and plates for identified projects, protections having expired on March 31. Orders for sheets continue to pour in, but mills are so far oversold that orders are being scrutinized carefully to see that they are for actual requirements. Some orders are being pared down considerably. There is considerable labor unrest, with strikes in several consumer plants.

BASIC ELECTRIC STEEL

FORGINGS



N.F.& O. Basic Electric Steel produced under rigid metallurgical control is an important *quality* factor in the ultimate forged product

BASIC ELECTRIC STEEL

Carbon, Alloy, Corrosion Resistant and Special Steels Smooth Forged, Hollow Bored, Rough or Finished Machined, Heat Treated to Specifications . . . Forging Quality Ingots, Pressed or Hammered Billets.

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

. . . . NEW YORK. . . .

. . . Business quieter though still in good volume.

o o o

. . . Mills booked through the quarter on some products.

NEW YORK, April 6.—With the passing of the first quarter, on the last day of which protections on identified construction projects were withdrawn and the deadline was reached on specifications against requirements contracts, the volume of incoming steel business has declined. Orders were in large volume up to the last day of March, and some that were mailed on that date came into steel companies' offices during the first two or three days of April, but since that time there has been a comparative lull. This does not indicate any lessening of buyers' needs, but the immediate urge for buying has declined, at least temporarily, because mills have very little, if any, open space on their second quarter rolling schedules.

Some steel companies, particularly makers of sheets and strip, are now openly soliciting orders for the third quarter whereas heretofore they were taking such business only under compulsion. However, this is not solicitation in the usual sense because mills are merely going to their regular customers to tell them how much tonnage they can allot to them for third quarter shipment. Buyers who attempt to exceed their allotments frequently find that the mills pare them down. Thus the allocation of some grades of steel that has been going on recently will be extended into the third quarter.

March steel business was generally the largest of any month in the post-depression period, while shipments were easily double those of March last year. Most mills are booked solid through April and May on most products and through the entire quarter and well into third quarter on sheets and strip, while tin plate tonnage is sold out until October.

Pig Iron

Domestic and export outlets continued to absorb some new business last week, but offerings remained scanty and demand, other than from foreign buyers, was restrained. Beneath the surface indications appeared that furnaces were again considering a price increase. Consumers of pig iron continued to take deliveries in volume last week. The stack at Troy, N. Y., is engaged with repairs, but should reenter blast by about the first week in May. With warm weather in prospect, resumption of shipment through the State barge canal is anticipated. This will release between 7000 and 8000 tons of iron hitherto held up on the way by ice.

Reinforcing Steel

Awards of reinforcing bars this week are unimpressive, and little important tonnage is seen ahead. Some work has gone at the second quarter price, which is understood to have been shaded, but a fair test has not yet been made of this market. A great deal of covering on advance construction projects was done at the first quarter price, according to sellers here, so that there may not be much of interest coming out at the new price for some time. Government buying of reinforcing bars eased off nearly six months ago, so that the new policy now being advocated by the President is not expected to alter present conditions.

Plates and Shapes

Interest in the plate market is currently centered on what will be done with the bids for the construction of the cabin liner for the United States Lines which were opened Thursday of last week. Several previous bids having been rejected on one pretense or another, sellers are hoping that this time an award will be made. The New York Shipbuilding Corp. and Newport News Shipbuilding & Dry Dock Co. offered bids for the construction of the vessel. The provisions of the subsidy laws recently announced by the Maritime Commission are expected to cause the scrapping of many old boats and the subsequent construction of others for replacement. The great problem confronting sheet sellers is to turn down tonnage and keep the good will of the prospective buyer at the same time. Orders are being booked all the time, almost without exception at price at time of shipment, jobbers are active, and demand shows no signs of easing.

. . SAN FRANCISCO . .

. . . Steel demand slows up because of long deliveries.

SAN FRANCISCO, April 5.—With few deliveries of any type of steel being promised in less than 60 days, the demand has fallen off somewhat on the Pacific Coast. The Seattle market is particularly slow. Cast-iron pipe awards and inquiries, after a month's extreme activity, have slackened considerably.

Bids have been opened on 2114 tons of reinforcing bars in one invitation for the All-American Canal project and an additional 315 tons in two others. At Los Angeles the Metropolitan Water District has opened bids on 845 tons of 40-lb. rail.

J. H. Pomeroy is low bidder on the general contract for a superstructure of the San Francisco-Oakland Bay Bridge, which calls for 2200 tons of structural and 160 tons of reinforcing steel.

Ingalls Iron Works took the only large award of the week—1700 tons of structural shapes involved in supply buildings for the Government air depot at Sacramento, Cal. Aggregate shape awards reached 2456 tons while reinforcing bar lettings totaled only 978 tons.

. . . BOSTON . . .

. . . *Pig iron sales in small lots.*

BOSTON, April 6.—Pig iron continues to move in small tonnages, but aggregate weekly sales suggest that foundries in general are not as uneasy regarding supplies as heretofore. Interest centers more in the labor situation, both local and national, than in raw material. The weekly foundry melt is holding up remarkably well. Some imported is still available, but foreign irons are less of a market factor than they have been in years.

Tin Plate Prices Advanced 50c. a Box

CARNEGIE-ILLINOIS Steel Corp. announces today the following prices which are effective immediately: coke tin plate $5.35 per base box, Pittsburgh, $5.45 per base box, Gary, plus transportation charges in effect at time of shipment. Special coated manufacturing ternes, $4.65 per base box, Pittsburgh and $4.75 per base box Gary, plus transportation charges in effect at the time of shipment.

U. S. Steel Develops Monel Rail Exhibit

RAILROAD executives and engineers in charge of maintenance of way formed an interested audience for a dialogue between two giant "talking rails," at the twenty-sixth annual exhibition of railway appliances held in Chicago March 15 to 18 inclusive. The two rails which carried on the conversation were the central feature of the exhibit of the United States Steel Corp. subsidiaries.

The two principal characters in the conversation between the rails were replicas of an ordinary rail, which complained about the increasing stresses of modern rail traffic, and a new Brunorized rail, which told how it was produced to meet the increasingly exacting demands of this traffic. A new Brunorizing furnace, first of its kind in the world, was opened to public inspection at the Gary Works of the Carnegie-Illinois Steel Corp. a week previous to the appliance show.

A NOVEL advertising stunt developed by United States Steel Corp. features "talking rails" at the Chicago exhibition of railway appliances and boosts the new Brunorized rail.

In addition to the talking rails, the exhibit featured track fittings, bearing piles, I-Beam-Lok, reinforcing bars, high tensile steels, stainless steels, frogs and switches, culvert sheets and plates, wire, wire rope, fence, rail bonds and tubular products, all produced by United States Steel Corp. subsidiaries.

DINGS

Hot Separators Won't Separate!

This is important to anyone considering the purchase of a magnetic separator.
Separators are *not* all the same and Dings engineers have gone farther in developing features for cool separator operation than *any other manufacturer.*
Magnetic Pull is the result of current—the more current consumed the more pull, and the better the separation.
Dings design includes larger longitudinal and radial openings than on other separators, but more than this. It includes vanes on the sides of radial openings between pulley sections that assure *twice the heat radiating surface of any other make of pulley, size for size.* This makes possible the use of more current without heating up—*and, of course, better separation.*
Don't buy a separator without investigation—come to Separator Headquarters and you will be reliably advised without any obligation on your part.

Dings High Intensity MAGNETIC SEPARATION

Dings Magnetic Separator Co.
727 Smith Street, Milwaukee, Wisconsin

MAGNETIC CLUTCHES

Dings magnetic clutches solve many a clutch problem. They are simple, operate economically and without attention. Due to their great power and small size, they solve many a clutch problem where reduced space must be considered. They provide smooth engagement, will stop under overload and are particularly adapted to remote control and high speed drives or problems involving accurate synchronization. If you have a clutch problem, let us help you.

SEPARATION HEADQUARTERS SINCE 1899

. . .NON-FERROUS. . .

. . . Producers lower copper to 16c. following preceding advance to 17c.

o o o

. . . Lead reduced $1 a ton by all but the largest producer.

o o o

. . . Tin deliveries at all-time record; prices off.

NEW YORK, April 6.—In a surprise move, copper producers raised the price for electrolytic ¾c. a lb. late on March 30 to 17c., delivered Connecticut Valley, but were forced to relower it a full 1c. today. The current quotation is therefore 16c., Connecticut Valley. Explanation of this action is that the London market grew very unstable during the week, necessitating two revisions in domestic prices. Buyers bought on the rise, but have since become inactive, and aggregate sales for the past calendar week were about 17,500 tons. Present tendency of the London market is still irregular, this being reflected by a wide range in export quotations today of from 15.37½c., c.i.f., to 15.87½c.

The Week's Prices. Cents Per Pound for Early Delivery

	Mar. 31	Apr. 1	Apr. 2	Apr. 3	Apr. 5	Apr. 6
Electrolytic copper, Conn.*	17.00	17.00	17.00	17.00	17.00	16.00
Lake copper, N. Y.	17.12½	17.12½	17.12½	17.12½	17.12½	16.12½
Straits tin, spot, New York	64.75	63.50	62.62½	....	62.87½	61.87½
Zinc, East St. Louis	7.50	7.50	7.50	7.50	7.50	7.50
Zinc, New York	7.85	7.85	7.85	7.85	7.85	7.85
Lead, St. Louis	6.80	6.80	6.75	6.75	6.75	6.75
Lead, New York	6.95	6.95	6.90	6.90	6.90	6.90

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Noon Price.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 17.00c. a lb., New York.
Quicksilver, $91.00 to $93.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 16.75c. a lb. delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse
Delivered Prices, Base per Lb.

Tin, Straits pig	63.00c. to 64.00c.
Tin, bar	65.00c. to 66.00c.
Copper, Lake	17.25c. to 18.25c.
Copper, electrolytic	17.25c. to 18.25c.
Copper, castings	17.25c. to 18.25c.
*Copper sheets, hot-rolled	23.87½c.
*High brass sheets	21.25c.
*Seamless brass tubes	24.00c.
*Seamless copper tubes	24.62½c.
*Brass rods	17.62½c.
Zinc, slabs	7.75c. to 8.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.75c.
Lead, American pig	7.75c. to 8.75c.
Lead, bar	8.75c. to 9.75c.
Lead, sheets, cut	10.50c.
Antimony, Asiatic	18.00c. to 19.00c.
Alum., virgin, 99 per cent plus	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	40.00c. to 42.00c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse
Delivered Prices per Lb.

Tin, Straits pig	67.00c.
Tin, bar	69.00c.
Copper, Lake	17.00c. to 17.25c.
Copper, electrolytic	17.00c. to 17.25c.
Copper, castings	16.75c. to 17.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig	7.40c. to 7.65c.
Lead, bar	11.00c.
Antimony, Asiatic	18.75c.
Babbitt metal, medium grade	26.00c.
Babbitt metal, high grade	71.00c.
Solder, ½ and ½	41.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.37½c.	14.12½c.
Copper, hvy. and wire	13.25c.	13.75c.
Copper, light and bottoms	12.25c.	12.50c.
Brass, heavy	8.25c.	8.87½c.
Brass, light	6.50c.	7.25c.
Hvy. machine composition	11.75c.	12.25c.
No. 1 yel. brass turnings	8.62½c.	9.12½c.
No. 1 red brass or compos. turnings	11.12½c.	11.62½c.
Lead, heavy	5.75c.	6.12½c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	4.25c.	4.62½c.

Lead

The American Smelting & Refining Co. reduced its quotation for lead $1 a ton on April 2 to 6.75c., St. Louis, and 6.90c., New York, but S. Joseph Lead Co. continued to quote 6.85c., St. Louis, and 7.00c. and 7.05c., New York. The latter producer sold in excess of its intake on two consecutive days last week, but experienced a shrinkage in demand following action of the Smelting Co. in lowering its price. The business was unevenly divided, as quiet conditions affected other sellers. Lead weakened in London during the week in common with other metals.

Zinc

Placing of one or two large third quarter contracts by important users expanded smelter sales last week to between 9000 and 10,000 tons. Shipments fell just under 7000 tons. Few producers shared in the business, and trading continued generally quiet. While the price here held firm at 7.50c., East St. Louis, the London market grew noticeably weaker on continued liquidation by speculators, and had some influence upon sentiment in domestic circles. Pressure on prime Western grade metal in the domestic market appears to be dissipating, as production of intermediate grades increases.

Tin

United States deliveries of tin in March were 9080 tons, a new high record. The previous high was 8795 tons in January, 1929. Against expectations of a decrease in stocks, the world's visible supply rose by 353 tons to 24,327 tons at March 31. The statistics affected trading adversely, and demand was negligible all week. Prices worked steadily lower to a basis for spot Straits metal at New York this noon of about 61.87½c. The morning's standard quotations in London were £283 spot and £280 5s. futures, while the price in the East was £282 10s.

March Averages

The average prices of the major non-ferrous metals during March were as follows: electrolytic copper, Conn., 16.000c., Lake copper, N. Y., 16.125c.; Straits spot tin, New York, 62.739c.; zinc, East St. Louis, 7.381c., zinc, New York, 7.731c.; lead, St. Louis, 7.039c., lead, New York, 7.189c.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Price increases of 10 to 15 per cent a spur to further buying.

o o o

. . . Long deliveries, however, act as check on some contemplated purchases.

o o o

. . . Continued epidemic of sit-down strikes is having effect on sentiment.

Detroit

PRICE increases of 10 to 15 per cent, already in effect in many cases, spurred some buyers into placing orders in time to get under the wire and have the benefit of the lower prices. Some buying has been done in Detroit for the new General Motors truck diesel plant at Redford, although inquiries for more equipment are out. Flint has been the scene of considerable activity as plans are rounded out for Chevrolet's new plant at Buffalo to manufacture 1200 engines and axles a day. Still strike-bound, Chrysler men have done part of their work on machinery buying from the offices of the Federal Engineering Co. Sales to Ford are anticipated on the basis of a consolidation and modernization program in the tool and die department.

Pittsburgh

NUMEROUS price advances went into effect April 1 ranging from 10 to 15 per cent with none of the usual time allowed for coverage. In most cases these prices were in addition to those announced on Jan. 1. Inquiries continue brisk. As an indication of the general strength of the market, one dealer reports an individual inquiry of between 60 and 70 machines. Orders are still in fair volume.

The hysteria of sit-down strikes, coupled with the apparent breakdown of authorities to adequately cope with the situation, is causing some concern both to dealers and customers as well as manufacturers.

Deliveries on practically all items are becoming further extended, and it is unsafe for dealers to quote promises without first obtaining verification from the factory.

Cleveland

MACHINE tool sales are holding up well with manufacturers, but the previously reported slowing down in the demand upon dealers in this territory is still in evidence. Decline in orders in this district is attributed largely to the presence of strikes and the fear of labor disturbances in plants not now bothered with strikes.

Inquiries are mostly for machines that plants need for current operations, and buyers are shopping around to assure equipment from sources that can make the best deliveries. Some are purchasing used machines because they do not want to wait for extended deliveries.

While many price advances went into effect April 1, there was not a spurt of buying before this price advance as was the case in December before the Jan. 1 advances went into effect.

The most conspicuous local activity is on the part of the White Motor Co., which, while it has not issued any formal lists, is occasionally buying a few tools as part of its recently announced expansion program.

Cincinnati

THERE is little change in the steady ordering of machinery in this area. Bookings the past week were on a parity with those of the preceding period, but are a little below the brisk rate of three weeks ago. Users have, in all probability, taken the edge off of urgent needs, particularly for lighter tools. Of course, delivery problems may also be retarding interest, since tool builders indicate daily extension of shipping dates. Some automobile retooling for crankshaft and grinding equipment is reported. Foreign demand is regarded as good, the easing being primarily from domestic sources.

Tool plants are operating at an average of about 85 per cent, although business warrants greater production. Lack of skilled labor and pattern damage, due to floods, are reported to be the deterring factors.

New York

SOME builders have already taken steps to protect themselves in the event of additional increases in costs by announcing that all orders requiring more than three months for delivery will obtain price at time of shipment up to 12½ per cent to 20 per cent above present levels. Business is still coming in at a fair rate, although bookings so far this month are running a little behind those of the first week in March. One seller reports that some buyers seem to be hesitating in placing their orders after inquiring, and he attributes this fact to the length of time being quoted for deliveries, six months and more in some instances. Some buying has been reported recently from the Babcock & Wilcox plant in Bayonne, which is being rehabilitated after being shut down the past few years.

Chicago

DEALERS report an active sales week and a satisfactory volume of new specifications on which to figure. Not all machine tool builders are pleased with March sales, but their disappointment appears to be due to nothing more than fluctuations which occur even in an active market. The Chicago & Eastern Illinois has purchased a lathe and several grinders. The Monon will buy some used equipment. The Union Pacific and the Burlington are busy tabulating bids.

Four Wheel Drive to Spend $100,000

PURCHASE of $100,000 worth of new production equipment by the Four Wheel Drive Auto Co., Clintonville, Wis., and Kitchener, Ont., is being undertaken because of a large increase in sales, according to Walter A. Olen, president and general manager.

Issuance of $100,000 in rights to stockholders to purchase a new issue of common stock has provided the company with new working capital. Additional working funds will be obtained after the close of the fiscal year, June 30, through the issuance of more rights, Mr. Olen said.

Expenditure of the $100,000 will provide the company with a new heat-treating department which is now being installed; new lathes, gear-cutting machinery, and other production equipment will also be purchased.

IRON AND STEEL SCRAP

. . . Decreases reported at Pittsburgh and Cleveland—Philadelphia up 50c.

o o o

. . . Other markets are at a standstill with material coming out freely.

STRENGTH is apparent this week only in eastern Pennsylvania, where a 50c. increase was made on the basis of mill purchases. In Pittsburgh and Cleveland the market eased off 50c., and in other scrap centers only a few changes were reported. Chief contributing factors to the current appearance of softness in the markets are discussions of scrap export limitations, and the President's speech concerning prices of durable goods. In Chicago late last week a top price of $22.50 a ton for No. 1 steel was recorded but an immediate reaction was reported to have set in, so that at this writing the prices remain unchanged. The scrap composite is steady at $21.92 a ton, the rise at Philadelphia having been counteracted by the decrease in Pittsburgh. In St. Louis and Boston, steady markets are attributed to strength in other centers, particularly eastern Pennsylvania. Both at Philadelphia and at Boston export accumulations are well depleted and will probably be cleaned up by the end of the week.

Pittsburgh

Within the past week the market has softened. A substantial tonnage of No. 1 steel was sold into consumption at $23.50 a ton, making the market quotable at $23 to $23.50, a drop of 50c. a ton from last week's quotations. A moderate-sized tonnage of railroad heavy melting accompanied the same transaction at $24.50 a ton. Consistent talk of scrap embargoes, the President's remarks concerning cost of raw materials, and resistance to high scrap prices, played an important part in last week's reaction. Whether the weakness will become more pronounced is uncertain at this time, but it is quite possible that the market may level off further in the next few weeks. Closing of railroad lists this week will clarify the situation to some extent.

Chicago

Prices for heavy melting steel surged to a new high of $22.50 a ton, delivered, and then a reaction set in which lowered trading prices between dealers and brokers. Conditions are now at a standstill, with the market generally leaning slightly toward the weak side. Some in the trade hold to the opinion that political utterances and the talk of checking exports are the dominant factors in the changed price picture.

Cleveland

A turn in the market has developed with declines of 50c. to 75c. a ton on steel-making scrap. The weakness has been caused by the holding up of scrap by Youngstown district mills, which have been receiving shipments faster than needed. However, there are unconfirmed reports that some steel-making scrap consigned for export has been diverted to the Pittsburgh and Youngstown districts because vessel capacity was not available to ship abroad, and brokers think that perhaps the influx of Eastern scrap is the cause of holding up of shipments. The automotive scrap lists that were closed last week brought good prices.

Buffalo

With the easing of outside markets, a similar effect is noticed here. No large sales are noted, though prices remain the same with the exception of machine shop turnings. The largest consumer recently fixed a $7 differential below heavy melting steel instead of a $6 differential. Sales of cast and specialties at the market have been made.

Philadelphia

Although supply of scrap seems to be easier, the price of No. 1 steel has been increased 50c. to $20.50 to $21 on the basis of reports of sales to the district's largest consumer at $21 and more. No. 2 follows along at $19.50 to $20. A wave of selling followed the President's remarks last week concerning steel prices, as small dealers whose stocks were high, foreseeing a sudden drop in scrap prices, endeavored to rid themselves of some of their holdings. That this action was premature was soon seen as it became apparent that mills were ignoring the Presidential comments. Accumulations at Port Richmond are nearly exhausted, with two boats now loading and another expected late this week. It is believed that from now on the permit system now being used by railroads to limit large shipments to docking sites will become permanent, and that only when boats are immediately available will carriers accept shipments to ports.

St. Louis

Although there was no buying of scrap by mills in the St. Louis district during the week and there still is a free movement of scrap from country dealers to this market, prices are unchanged, being maintained largely as a result of strength in Eastern markets, where as much as $2 a ton above St. Louis, including the freight differential, is being paid. The Wabash list of 2200 tons, including 1000 tons of No. 1 steel and 500 tons of rails under 3 ft., went to other markets, principally Chicago, as the material was in the road's Decatur, Ill., shops.

New York

Agitation for some sort of curb on exports and the administration's criticism of high prices in iron and steel have affected the undertone in this market, and demand is less pronounced. The lull may be due to previous heavy buying, as steel mills are said to have covered far ahead. No grades of scrap for domestic shipment are lower in price, but the upward trend appears to have been halted at least. For heavy melting steel delivered at the docks, however, dealers here again raised their quotations, No. 1 steel being quoted at from $17.50 to $18 a ton and No. 2 at $1 less. Supplies of scrap generally are coming out profusely, offerings now being as large as facilities permit.

Boston

Exporting is being pushed to the limit, and indications are that congestion at the Army Base and Mystic docks will be cleaned up within a week. Buying of stove plate by Germany and England has lifted the price considerably, but export prices otherwise are unchanged. No. 1 cast at $22 a ton, delivered eastern Pennsylvania, and breakable cast at $20, while bringing out little material here, have aided local prices.

Detroit

Prices have apparently passed their peak, the principal reason for weakness developing since Friday being outside influences. The Chevrolet list went high last week, however, because of a shortage of scrap, with Hudson, Briggs and Chrysler lists closed. Buying to cover on old contracts sent bundles and low phos plate scrap to $21, and 135 cars of borings and turnings went at $15. The trend is not yet strong enough, however, to alter present quotations.

Cincinnati

Higher dealers' bids are attracting a good quantity of material into the market, the trade reporting little difficulty in obtaining needed old materials. Purchasing is at a fair level and movement on contract good.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$23.00 to $23.50
Railroad hvy. mltng. ..	24.00 to 24.50
No. 2 hvy. mltng. steel.	19.50 to 20.00
No. 2 RR. wrought	23.00 to 23.50
Scrap rails	24.00 to 24.50
Rails 3 ft. and under..	26.50 to 27.00
Comp. sheet steel	23.00 to 23.50
Hand. bundled sheets.	20.50 to 21.00
Hvy. steel axle turn...	21.50 to 22.00
Machine shop turn.....	14.50 to 15.00
Short shov. turn.....	15.50 to 16.00
Mixed bor. & turn.....	14.50 to 15.00
Cast iron borings	14.50 to 15.00
Cast iron carwheels....	19.50 to 20.00
Hvy. breakable cast....	16.00 to 16.50
No. 1 cast	20.00 to 20.50
RR. knuckles & cplrs..	27.00 to 27.50
Rail coil & leaf springs	27.00 to 27.50
Rolled steel wheels....	27.00 to 27.50
Low phos. billet crops.	27.50 to 28.00
Low phos. sh. bar	27.00 to 27.50
Low phos. punchings..	25.00 to 25.50
Low phos. plate, hvy...	26.50 to 27.00
Low phos. plate clip..	25.00 to 25.50
Steel car axles	26.00 to 26.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	19.00 to 19.50
Comp. sheet steel	19.50 to 20.00
Light bund. stampings.	16.00 to 16.50
Drop forge flashings...	19.00 to 19.50
Machine shop turn....	13.50 to 14.00
Short shov. turn.....	14.50 to 15.00
No. 1 busheling	19.50 to 20.00
Steel axle turnings....	17.00 to 17.50
Low phos. billet and bloom crops	26.00 to 26.25
Cast iron borings	14.50 to 15.00
Mixed bor. & turn. ...	14.50 to 15.00
No. 2 busheling	14.50 to 15.00
No. 1 cast	20.50 to 21.00
Railroad grate bars...	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	24.50 to 25.00
Rails for rolling	21.50 to 22.00
Railroad malleable ...	21.00 to 21.50
Cast iron carwheels....	18.50 to 19.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	19.50 to 20.00
Hydraulic bund., new.	19.00 to 19.50
Hydraulic bund., old..	..... 17.00
Steel rails for rolling..	22.00 to 23.00
Cast iron carwheels ..	21.50 to 22.00
Hvy. breakable cast ..	20.00 to 20.50
No. 1 cast	22.50 to 23.00
Stove plate (steel wks.)	17.00 to 17.50
Railroad malleable	19.50 to 20.00
Machine shop turn....	14.50 to 15.00
No. 1 blast furnace	13.50 to 14.00
Cast borings	13.50 to 14.00
Heavy axle turnings..	18.00 to 18.50
No. 1 low phos. hvy....	25.00 to 25.50
Couplers & knuckles..	25.00 to 25.50
Rolled steel wheels ...	25.00 to 25.50
Steel axles	25.50 to 26.00
Shafting	25.00 to 26.00
No. 1 RR. wrought	20.00 to 21.00
Spec. iron & steel pipe	17.50 to 18.00
No. 1 forge fire	17.50 to 18.00
Cast borings (chem.).	14.00 to 15.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$21.50 to $22.00
Auto. hvy. mltng. steel.	19.50 to 20.00
Alloy free	19.00 to 19.50
Shoveling steel	21.50 to 22.00
Hydraul. comp. sheets.	20.50 to 21.00
Drop forge flashings...	17.50 to 18.00
No. 1 busheling	19.00 to 19.50
Rolled carwheels	23.00 to 23.50
Railroad tires, cut	23.50 to 24.00
Railroad leaf springs ..	23.50 to 24.00
Steel coup. & knuckles	23.50 to 24.00
Axle turnings	19.00 to 19.50
Coil springs	25.50 to 26.00
Axle turn. (elec.)	22.00 to 22.50
Low phos. punchings..	24.25 to 24.75
Low phos. plates, 12 in. and under	24.25 to 24.75
Cast iron borings	12.75 to 13.25
Short shov. turnings..	12.75 to 13.25
Machine shop turn. ...	11.50 to 12.00
Rerolling rails	23.50 to 24.00
Steel rails under 3 ft...	23.25 to 23.75
Steel rails under 2 ft...	25.00 to 25.50
Angle bars, steel	24.50 to 25.00
Cast iron carwheels ...	21.50 to 22.00
Railroad malleable	23.00 to 23.50
Agric. malleable	18.75 to 19.25
Iron car axles	26.50 to 27.00

	Per Net Ton
Steel car axles	$24.50 to $25.00
No. 1 RR. wrought....	19.75 to 20.25
No. 2 RR. wrought....	19.75 to 20.25
No. 2 busheling, old..	9.00 to 9.50
Locomotive tires	19.50 to 20.00
Pipes and flues	14.50 to 15.00
No. 1 machinery cast..	18.00 to 18.50
Clean auto. cast	16.50 to 17.00
No. 1 railroad cast	16.75 to 17.25
No. 1 agric. cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Grate bars	14.00 to 14.50
Brake shoes	14.00 to 14.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$21.00 to $21.50
No. 2 hvy. mltng. steel.	19.50 to 20.00
Scrap rails	21.00 to 21.50
New hvy. b'ndled sheet	19.50 to 20.00
Old hydraul. bundles ..	18.50 to 19.00
Drop forge flashings ..	19.50 to 20.00
No. 1 busheling	19.50 to 20.00
Hvy. axle turnings....	15.50 to 16.00
Machine shop turn.	14.00 to 14.50
Knuckles & couplers..	23.50 to 24.00
Coil & leaf springs....	23.50 to 24.00
Rolled steel wheels....	23.50 to 24.00
Low phos. billet crops.	24.00 to 25.00
Shov. turnings	15.50 to 16.00
Mixed bor. & turn.	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Steel car axles	22.00 to 22.50
No. 1 machinery cast..	19.50 to 20.00
No. 1 cupola cast.....	18.50 to 19.00
Stove plate	15.50 to 16.00
Steel rails under 3 ft...	24.00 to 25.00
Cast iron carwheels...	19.00 to 19.50
Railroad malleable	21.50 to 22.50
Chemical borings	14.50 to 15.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$15.00 to $18.00
Scrap steel rails	17.00 to 19.00
Short shov. turnings..	9.00 to 10.00
Stove plate	9.00 to 10.50
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought....	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 17.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel...	$18.50 to $19.00
No. 1 hvy. melting....	18.00 to 18.50
No. 2 hvy. melting....	16.00 to 16.50
No. 1 locomotive tires.	20.00 to 20.50
Misc. stand.-sec. rails.	19.00 to 19.50
Railroad springs	21.50 to 22.00
Bundled sheets	11.00 to 11.50
No. 2 RR. wrought ...	18.00 to 18.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	20.00 to 20.50
Machine shop turn....	9.00 to 9.50
Heavy turnings	14.00 to 14.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	15.50 to 16.00
Steel rails under 3 ft. ..	20.00 to 20.50
Steel angle bars	19.25 to 19.75
Cast iron carwheels...	19.00 to 19.50
No. 1 machinery cast.	15.00 to 15.50
Railroad malleable ...	19.50 to 20.00
No. 1 railroad cast ...	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$18.75 to $19.25
No. 2 hvy. mltng. steel.	16.75 to 17.25
Scrap rails for mltng...	22.00 to 22.50
Loose sheet clippings ..	14.50 to 15.00
Bundled sheets	16.50 to 17.00
Cast iron borings	12.00 to 12.50
Machine shop turn.....	12.75 to 13.25
No. 1 busheling	16.00 to 16.50
No. 2 busheling	10.50 to 11.00
Rails for rolling	23.50 to 24.00
No. 1 locomotive tires..	18.00 to 18.50
Short rails	24.00 to 24.50
Cast iron carwheels ..	18.50 to 19.00
No. 1 machinery cast ..	18.00 to 18.50
No. 1 railroad cast	17.00 to 17.50
Burnt cast	12.50 to 13.00
Stove plate	12.50 to 13.00
Agricult. malleable	18.00 to 18.50
Railroad malleable	19.50 to 20.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$17.75 to $18.25
No. 2 hvy. mltng. steel.	16.75 to 17.25
Borings and turnings.	13.50 to 14.00
Long turnings	13.50 to 14.00
Short shov. turnings.	14.50 to 15.00
No. 1 machinery cast..	17.25 to 17.75
Automotive cast	18.50 to 19.00
Hydraul. comp. sheets.	19.25 to 19.75
Stove plate	11.25 to 11.75
New factory bushel...	17.50 to 18.00
Old No. 2 busheling..	11.75 to 12.25
No. 2 busheling (black fender stock)	13.00 to 13.50
Sheet clippings	14.00 to 14.50
Flashings	16.00 to 16.50
Low phos. plate scrap.	19.00 to 19.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$22.00 to $22.50
Hydraulic bundles	21.50 to 22.00
Machine shop turn	15.00 to 15.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$17.50 to $18.00
No. 2 hvy. mltng. steel.	16.00 to 16.50
Hvy. breakable cast..	15.50 to 16.00
No. 1 machinery cast...	16.75 to 17.25
No. 2 cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Steel car axles.....	25.00 to 26.00
Shafting	20.00 to 20.50
No. 1 RR. wrought...	17.50 to 18.00
No. 1 wrought long...	16.50 to 17.00
Spec. iron & steel pipe	14.50 to 15.00
Rails for rolling.....	18.50 to 19.00
Clean steel turnings ..	9.00 to 9.50
Cast borings	10.00 to 10.50
No. 1 blast furnace	10.00 to 10.50
Cast borings (chem.)..	12.00 to 12.50
Unprepar. yard scrap..	11.00 to 11.50

Per gross ton, delivered local foundries.

No. 1 machn. cast....	$18.00 to $18.50
No. 1 hvy. cast cupola.	15.50 to 16.00
No. 2 cast	14.50 to 15.00

Add 50c. to 75c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$16.30 to $16.80
Scrap rails	16.30 to 16.80
No. 2 steel.....	15.25 to 15.75
Breakable cast	14.50 to 15.50
Machine shop turn.....	9.50 to 10.50
Mixed bor. & turn.....	7.80 to 9.20
Bund. skeleton long....	13.50 to 13.75
Shafting	19.00 to 19.50
Cast bor. chemical....	9.50 to 10.25

Per gross ton delivered consumers' yards:

Textile cast	$17.00 to $19.00
No. 1 machine cast...	17.00 to 19.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton

	Toronto	Montreal
No. 1 hvy. mltng. stl...	$13.50	$13.00
No. 2 hvy. mltg. stl...	12.50	12.00
Mixed dealers steel....	12.00	11.75
Scrap pipe	10.25	9.75
Steel turnings	9.00	8.50
Cast borings	9.75	9.50
Machinery cast	17.50	17.00
Dealers cast	15.50	15.00
Stove plate	13.00	12.75

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.

No. 1 hvy. mltng. steel.	$17.50 to $18.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
No. 2 cast	15.50 to 16.00
Stove plate	12.50 to 13.00
Steel rails (scrap) ...	17.50 to 18.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$17.00 to $17.50
No. 2 hvy. mltng. steel.	16.00 to 17.00
Rails (scrap)	17.00 to 17.50
Stove plate	14.50
No. 2 cast	14.75 to 15.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$18.50
No. 2 hvy. mltng. steel.	17.50

New Orleans, f.a.s., Stuyvesant Dock

No. 1 hvy. mltng. steel.	$17.50
No. 2 hvy. mltng. steel.	16.50

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles ..	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.78c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.60c.
Del'd Detroit	2.70c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.53c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

F.o.b. Pittsburgh	3.80c.
F.o.b. Chicago	3.85c.
F.o.b. Coatesville	3.90c.
F.o.b. cars dock Gulf ports	4.20c.
F.o.b. cars dock Pacific ports	4.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5025c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birminham	3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

	Per Base Box
F.o.b. Pittsburgh	*$4.65
F.o.b. Gary	* 4.75
F.o.b. Granite City	4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$11.00
15-lb. coating I.C.	13.00
20-lb. coating I.C.	14.00
25-lb. coating I.C.	15.00
30-lb. coating I.C.	16.25
40-lb. coating I.C.	18.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ In.

	Base per Lb
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.35c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	2.75c.
Smooth coated nails	2.75c.

	Base per 100 Lb.
Annealed fence wire	$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column	74
Single loop bale ties, base col.	63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	52	31	¼ & ⅜	+6	+26
¼ to ⅜	55	38½	½	27	10½
½	59½	49	¾	32	16
¾	62½	53	1 & 1¼	35	21
1 to 3	64½	55	1½	39	23½
			2	38½	23

Lap Weld

2	57	47½	2	32½ 18
2½ & 3	60	50½	2½ to 3½	33½ 20½
3½ to 6	62	52½	4 to 8	35½ 24
7 & 8	61	50½	9 to 12	28½ 15
9 & 10	60½	50		
11 & 12	59½	49		

Butt Weld, extra strong, plain ends

⅛	50½	36½	¼ & ⅜	+7 +39
¼ to ⅜	52½	40½	½	28 13
½	57½	48½	¾	33 18
¾	61½	52½	1 to 2	39 24½
1 to 3	63	55		

Lap Weld, extra strong, plain ends

2	55	46½	2	35½ 21½
2½ & 3	59	50½	2½ to 4	41 28½
3½ to 6	62½	54	4½ to 6	40½ 28
7 & 8	61½	51	7 & 8	41½ 28½
9 & 10	60½	50	9 to 12	32 20½
11 & 12	59½	49		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d. 13 B.W.G.	11.21	9.96
1½ in. o.d. 13 B.W.G.	12.38	11.00
1¾ in. o.d. 13 B.W.G.	14.09	12.51
2 in. o.d 13 B.W.G.	15.78	14.02
2¼ in. o.d. 13 B.W.G.	17.60	15.63
2¼ in. o.d. 12 B.W.G.	19.37	17.21
2½ in. o.d. 12 B.W.G.	21.22	18.85
2¾ in. o.d. 12 B.W.G.	22.49	19.98
3 in. o.d. 12 B.W.G.	23.60	20.97
3½ in. o.d. 10 B.W.G.	45.19	40.15
3½ in. o.d. 11 B.W.G.	29.79	26.47
4 in. o.d. 10 B.W.G.	36.96	32.83
5 in. o.d. 9 B.W.G.	56.71	50.38
6 in. o.d. 7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $41, Birmingham, and $49.50, delivered Chicago; and 4-in. pipe, $44, Birmingham, and $52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3, and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex, blank or tapped:	
½ in. and smaller	65 and 5*
9/16 in. to 1 in. inclusive	60 and 10*
1⅛ in. and larger	60 and 5*

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 20
9/16 in. to 1 in. inclusive	60 and 15
1⅛ in. and larger	60 and 12½
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	81½

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70
F.o.b. Cleveland	70
F.o.b. Chicago and Birmingham	70

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	$1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.35
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

	Base Per Lb.
High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£15
Tin plate, per base box	24s. to 25s.
Steel bars, open-hearth	£9 5s.
Beams, open-hearth	£9 2s. 6d.
Channels, open-hearth	£9 2s. 6d.
Angles, open-hearth	£9 2s. 6d.
Black sheets, No. 24 gage	£13
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Metric Ton, Gold £.
f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£3 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£5
Sheet bars	£3 8s.
Plate ¼ in. and up	£6 7s.
Plate 3/16 in. and 5 mm.	£6 13s.
Sheet, ⅛ in.	£7 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£6

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	3.90c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	6.50c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.82c.
Galvanized sheets (No. 24*)	5.72c.
Long terne sheets (No. 24)	6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	$3.40

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

†125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24)*	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
‡Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
‡Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles.	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload.	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes,	
2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO

	Base per Lb
Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

	Base per Lb
Channels, angles	4.20c.
Tees and zees, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	4.08c
Floor plates, diamond pattern.	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	4.71c.
Boiler rivets, cone head (keg lots)	4.81c.
Track spikes (keg lots)	4.26c.
Track bolts (keg lots)	5.71c.
Black annealed wire (No. 6 to No. 9 incl.)	4.66c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.31c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller	65-10
Larger	65
Coach and lag screws	65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.85c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.11c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.80c.
Bands	3.85c.
Hoops	4.10c.
Special threading steel	3.95c.
Checkered floor plates ¼ in. and heavier	5.90c.
Galvanized bars, bands and small shapes	6.35c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

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* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	60

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.14c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.10c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$3.30
Bolts and nuts, per cent off list	65

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.65	$3.60	$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
High-heat duty, New Jersey	56.00
High-heat duty, Ohio	44.00
Intermediate, Pennsylvania Maryland, Kentucy, Missouri and Illinois	49.00
Intermediate, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	21.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$95.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$30.00
F.o.b. New Orleans	30.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$28.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.35
Ferrotungsten, lots of 5000 lb.	1.40
Ferrotungsten, smaller lots	1.45
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrochromium, 2% carbon	16.50 to 17.00c.
Ferrochromium, 1% carbon	17.50 to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	95.00
2.50% carbon grade	100.00
2% carbon grade	105.00
1% carbon grade	115.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	34c.
Man., African, Indian, 44-48%	25c. to 30c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48½%	Nominal..25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$18.00 to $18.50
Tungsten, domestic, scheelite delivered, nominal	$18.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to $25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	$25.50 to $26.00
50%	24.50
48-49%	24.50 to 25.00

FLUORSPAR *Per Net Ton*

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$19.00 to $20.00
Domestic, barge and rail	$19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL *Per Gal.*

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.25c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$4.25 to $4.35
Foundry, f.o.b. Connellsville, Prompt	4.75 to 5.80
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	12.00
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.85
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, has let general contract to Austin Co., Cleveland, for three-story and basement addition to branch plant at Elwood, Ind., 200 x 212 ft., primarily for storage and distribution. Cost over $225,000 with equipment.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has plans for one-story foundry addition to branch plant at Yonkers, N. Y. Cost close to $45,000 with equipment.

Pepsi-Cola Co., 47-51 Thirty-third Street, Long Island City, N. Y., has acquired about one and three-quarters acres at New Brunswick, N. J., with frontage, 260 x 350 ft., for new one-story mechanical bottling plant, for which superstructure will begin at once. Cost over $100,000 with equipment.

Mantle Machinery & Patents Co., New York, recently organized, has leased space in building at 27-33 West Twentieth Street, for a machine shop.

Pan-American Airways System, 135 East Forty-second Street, New York, plans one-story airplane hangar, 180 x 235 ft., with repair and reconditioning shop at Miami, Fla., airport. Cost over $150,000 with equipment. L. B. Taylor, Congress Building, Miami, is engineer.

Habirshaw Cable & Wire Corp., Yonkers, N. Y., has purchased from city tract adjoining plant, fronting on Hudson River, for one and multi-story additions, for which superstructure will begin soon. Cost close to $850,000 with equipment. Company is a subsidiary of Phelps-Dodge Corp., New York.

Ethyl Gasoline Corp., 135 East Forty-second Street, New York, has work under way on initial unit of new gasoline plant on about 200-acre site at North Baton Rouge, La., with steel tank storage and distributing facilities, loading racks, machine shop and other mechanical departments. Project is being carried out under direction of E. I. duPont de Nemours & Co., Wilmington, Del. Following completion, a second unit will be built to double initial capacity. Entire project will cost over $2,000,000 with machinery.

Machinery Builders, Inc., 55 West Sixteenth Street, New York, manufacturer of machinery and parts, has filed plans for new one-story machine shop, 40 x 100 ft., on Forty-sixth Road, Long Island City. Charles J. Stidolph, 87-01 Fifty-first Avenue, Elmhurst, L. I., is architect.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until April 12 for two curved radio mast antennas (Proposal 53432); until April 14, 20 cast steel buoys of six different types, varying from nine ft. diameter and 38 ft. long, to seven ft. diameter and 18 ft. long, all with skeleton lantern towers and bottom counterweights, and some with bells and gongs.

General Aniline Works, Inc., Grasselli, Linden, N. J., manufacturer of industrial chemical products, dyes, etc., has plans for two additions, each three and five stories, 45 x 250 ft., and 45 x 92 ft., respectively, and a one-story addition, 47 x 100 ft. First two noted units are for expansion in manufacturing division, and last mentioned for storage and distribution. Cost about $125,000 with equipment.

Joseph Stokes Rubber Co., Taylor Street, Trenton, N. J., manufacturer of hard rubber products, molded rubber goods, etc., has let general contract to Newton A. K. Bugbee & Co., Inc., 206 East Hanover Street, for one-story addition. Cost close to $50,000 with equipment.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until April 13 for nuts, bushings, cocks, cones, connectors, elbows, tees, pipe plugs, nipples, fittings, etc. (Aero Req. 1144).

Adam Scheidt Brewing Co., Norristown, Pa., will take bids soon for new nine-story brewhouse, and for several smaller structures. Cost over $125,000 with equipment. E. Lane Crawford, Norristown, is architect; H. P. Friend, Norristown, and Harold S. Ellington, Stroh Building, Detroit, are engineers.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until April 13 for taps, reamers, combination reamers, scoring punches, band seat form tools, twist drills, shaving tools, undercut tools, etc. (Circular 542), wire nails (Circular 547), 30 aluminum alloy casting end box adapters (Circular 529), five low-type, 24-in. duplex valves for ash hoppers (Circular 550); until April 15, 417,312 iron wood screws, 1¾ in. long (Circular 546).

NEW ENGLAND

Pratt & Whitney Co., Hartford, Conn., a unit of Niles-Bement-Pond Co., New York, is having plans drawn by Albert Kahn, Inc., New Center Building, Detroit, for group of one-story additions in Charter Oak Park district. Cost over $1,000,000 with equipment.

Arrow-Hart & Hegeman Electric Co., Hartford, has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, for two-story addition to South works, 64 x 130 ft. Cost over $75,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

General Electric Co., Bridgeport, Conn., is remodeling and modernizing property, recently acquired from Remington Arms Co., comprising six one-story buildings, about 250,000 sq. ft. floor space, for main plant for General Electric Supply Corp., a subsidiary. More than 100,000 sq. ft. of space will be equipped for production of electric washing machines, ironing machinery and allied domestic appliances, with remainder of space used for other electrical equipment production, storage and distribution. Domestic appliance division will be removed from present local plant to new location; space vacated in existing plant will be used for expansion in wire and cable division. C. E. Wilson is vice-president in charge of appliance division.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until April 20 for two locking differentials (Proposal 398-110).

Rustless Iron & Steel Corp., 1001 Edison Highway, Baltimore, has let general contract to Engineering Contracting Corp., North and Linden Avenue, for one-story additions for bar mill, melting shop, cold drawing and finishing mill, storage and distributing buildings. Cost over $500,000 with equipment. H. A. Brassert & Co., Chicago, are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until April 13 for nickel wire, pipe taps, cutting punches, carpenters' hammers, engine gongs, crosscut saws and other equipment (Schedule 3239); until April 20, one 20-ton, one 3-ton and four ½-ton chain hoists, 104,000 lb. common wire nails, 5000 lb. galvanized flooring nails, 7000 lb. galvanized steel-wire roofing nails, 12,000 lb. finishing nails, 432 scythe blades, galvanized corrugated roofing sheets, brass rods, galvanized malleable iron pipe fittings, galvanized pipe flanges, galvanized malleable iron unions, galvanized malleable iron railing fittings, brass or bronze pipe fittings, gate valves, globe valves, twist drills, metallic steam hose and other equipment (Schedule 3240).

Bull Run Power Co., Manassas, Va., is arranging financing in amount of $86,000 for extensions and improvements in power plant at Manassas, including additional equipment and new transmission and distributing lines for rural electrification.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 13 for air hose fittings (Schedule 300) for Puget Sound and Eastern Navy yards; 130 steel head shells, pierced and welded, and 130 steel head shells, seamless drawn (Schedule 267) for Newport, R. I., yard; horizontal, sationary type magnetic inspection equipments (Schedule 315), valves (Schedule 344), diesel engine-driven propelling plant and spare parts (Schedule 199); until April 15, parts for airplanes (Schedule 900-734), one motor-driven engine lathe (Schedule 312), seamless steel tubing (Schedule 328) for Eastern and Western yards; spare parts for airplanes (Schedule 900-711) for Sewall's Point yard; six motor-generator sets, control and voltage regulating equipment, and spare parts (Schedule 329) for Portsmouth and Mare Island yards.

BUFFALO DISTRICT

Trico Products Corp., 817 Washington Street, Buffalo, manufacturer of automobile equipment and appliances, has let general contract to John W. Cowper Co., Inc., Sidway Building, for six-story addition, 100 x 265 ft., with part of structure, 100 x 180 ft. Cost close to $500,000 with equipment. W. R. Jewell, 33 Frontenac Avenue, is architect.

Board of Education, City Hall, Buffalo, asks bids until April 27 for metal files, kitchen and cafteria equipment, lighting and other equipment for Kensington high school. Bureau of Architecture and Engineering, City Hall, is in charge.

SOUTH ATLANTIC

Southern Railway Co., Washington, has asked bids on general contract for extensions and improvements in engine house and shops near Atlanta, Ga. Cost over $40,000 with equipment.

Spartanburg Iron Works, Inc., Spartanburg, S. C., has acquired plant and business of Mountain City Foundry & Machine Works, Union Street, for expansion.

Columbus Provision Co., Columbus, Ga., manufacturer of food products, has asked bids on general contract for one-story addition. Cost close to $40,000 with equipment.

SOUTH CENTRAL

Iberia Sugar Co-operative Association, 1454 Joseph Street, New Orleans, J. J. Watson, president, has plans for new cane sugar mill on 30-acre tract recently acquired at New Iberia, La., to consist of main three-story refinery and smaller buildings, with storage and distributing structures, power house, machine shop and other mechanical departments. Cost close to $600,000 with machinery.

Glenmore Distilling Co., Owensboro, Ky., plans two multi-story additions, primarily for storage and distribution. Cost over $80,000 with equipment.

Magic City Brewing Co., Comer Building, Birmingham, has purchased local site for new brewery, comprising several one and multi-story units, with storage and distributing facilities. Cost close to $100,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until April 14 for wire rope as follows: 2800 ft. of ¾-in., 2800 ft. of ⅝-in., 1400 ft. of ½-in., 1400 ft. of ⅜-in., and 2800 ft. of ¼-in. (Circular 220).

Goodyear Tire & Rubber Co., Akron, Ohio, has approved plans for two-story addition to mill at Gadsden, Ala., 100 x 100 ft., for storage and distribution. Cost about $100,000 with equipment.

Ken-Rad Corp., Owensboro, Ky., manufacturer of radio tubes and kindred equipment, has let general contract to Hoffman Construction Co., Central Union Building, Evansville, Ind., for two and five-story additions, superstructure to begin at once. Cost about $170,000 with equipment.

SOUTHWEST

Hussmann-Ligonier Co., Inc., 2401 North Leffingwall Avenue, St. Louis, manufacturer of refrigerators and parts, has let general contract to William H. & Nelson Cunliff Co., 3320 Lindell Street, for two-story addition, 26 x 130 ft. Cost over $50,000 with equipment. Company is affiliated with Allied Store Utilities Co., first noted address.

Jackson County Highway Department, Court House, Kansas City, Mo., has rejected bids recently received for addition to equipment storage and distributing building at Independence, Mo., with repair and garage unit for department motor trucks. New bids will be asked soon on general contract. Cost about $100,000 with equipment. Engineering Service Co., Rail-

way Exchange Building, Kansas City, is engineer.

St. Louis Lead & Oil Works, Inc., 5500 Manchester Avenue, St. Louis, has let general contract to T. Jarvis Co., Railway Exchange Building, for one-story addition, 100 x 120 ft. Cost over $80,000 with equipment.

Southern Equipment Co., 5017 South Thirty-eighth Street, St. Louis, manufacturer of sheet metal products, has plans for one-story addition, 75 x 150 ft. Cost close to $50,000 with equipment.

Marley Co., 1915 Walnut Street, Kansas City, Mo., manufacturer of air-conditioning equipment, cooling towers and allied products, has leased one-story building at 1930-40 West Eighth Street, for expansion.

Todd-Galveston Dry Dock, Inc., Galveston, Tex., plans expansion in shipbuilding and repair plant, including new drydock unit, shops and other structures to double present capacity. Plant now includes two 10,000-ton floating drydocks and 1000-ton capacity marine railway. Cost over $400,000 with equipment. Company is a subsidiary of Todd Shipyards, Inc., New York.

Sterling Packing & Gasket Co., 1140 Rothwell Street, Houston, Tex., manufacturer of power plant specialties, has let general contract to R. C. Paul Co., 4114 Glenbrook Court, for new one-story plant. Cost close to $40,000 with equipment.

WESTERN PA. DIST.

Hookless Fastener Co., Meadville, Pa., manufacturer of metal slide fasteners and kindred specialties, has let general contract to George A. Rutherford Co., 2725 Prospect Avenue, Cleveland, for two-story addition. Cost about $80,000 with equipment. Wilbur Watson & Associates, Inc., 4614 Prospect Avenue, Cleveland, is architect and engineer.

Joseph Schlitz Brewing Co., Milwaukee, plans new mechanical-bottling plants at Wheeling, Charleston and Bluefield, W. Va., where sites are being acquired, each one-story, with storage and distributing departments. Cost about $70,000 each, with equipment.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until April 14 for one 25-kw. hydroelectric power unit for Lock No. 9, Allegheny River (Circular 343).

OHIO AND INDIANA

Euclid Road Machinery Co., Chardon Road, Euclid, Ohio, manufacturer of road-building machinery and parts, has let general contract to H. L. Vokes Co., 5300 Chester Avenue, for two one-story additions, 50 x 117 ft., and 40 x 60 ft. Cost over $50,000 with equipment.

Ira E. Baker Co., 1029 East Sixty-second Street, Cleveland, manufacturer of gas heaters and parts, boilers and other heating equipment, has acquired former plant of Metals Welding Co., and United District Heating Co., 4400 Perkins Avenue, N.E., 100 x 150 ft., consisting of two main units, and smaller buildings. Structure will be remodeled for new plant.

Forest City Brewery, Inc., 6900 Union Avenue, Cleveland, has asked bids on general contract for two-story addition, 47 x 70 ft., for mechanical-bottling unit. Cost close to $40,000 with equipment. R. Franklin Outcalt, 13124 Shaker Square, is architect.

Perfection Steel Body Co., Galion, Ohio, operating Perfection Burial Vault Co., has let contract for design and construction of one-story plant to F. & Y. Construction Co., 328 Town Street, Columbus, Ohio, engineer and contractor. It will total about 68,000 sq. ft. of floor space and will replace a unit destroyed by fire several months ago. Cost close to $250,000 with equipment.

Fort Pitt Steel Corp., 397 Phillips Avenue, Toledo, Ohio, has acquired local tract of land from E. I. duPont de Nemours & Co., and plans early erection of one-story mill to occupy entire site. Cost about $150,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until April 14 for 40 fuel system unit assemblies (Circular 632), 268,000 tinned copper braid (Circular 633); until April 15, four landing gear wheel and brake assemblies, and two brake assemblies (Circular 635), four governors, four counterweight brackets and four counterweight caps (Circular 638); until April 21, four aircraft speed tubes, electrically heated (Circular 634).

Board of School Commissioners, 150 North Meridian Street, Indianapolis, plans manual training department in new two-story and basement Irvington high school, for which bids will be asked soon on general contract. Cost about $450,000. McGuire & Shook, Fletcher Trust Building, are architects.

Contracting Officer, Quartermaster Corps, Jeffersonville, Ind., asks bids until April 14 for steel cabinets and one steel cabinet work bench (Proposal 431-170).

DeVilbiss Co., Toledo, Ohio, has let contract to Austin Co., Cleveland, for a one-story plant, 120 x 440 ft., for expansion in its rubber products division. Cost about $250,000 for building and equipment.

MICHIGAN DISTRICT

Buhl Stamping Co., 2730 Scotten Avenue, Detroit, has let general contract to Krieghoff Co., 6661 French Road, for second-story addition to present one-story plant unit. Cost close to $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Sommers Brothers Appliance Co., Saginaw, Mich., manufacturer of mechanical appliances, display racks, kitchen equipment, etc., plans early rebuilding of part of plant recently destroyed by fire. Loss over $60,000 with equipment.

Detroit Steel Products Co., 2250 East Grand Boulevard, Detroit, manufacturer of steel automobile springs, steel sash, doors, etc., has let general contract to W. E. Wood Co., 4649 Humboldt Street, for one-story addition. Cost over $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Kozy Coach Co., Kalamazoo, Mich., manufacturer of motor trailers, is negotiating for purchase of former plant of Checker Cab Co., manufacturer of taxicab bodies, and will remodel for expansion.

Ford Motor Co., Dearborn, Mich., has plans for new assembling plant at Vancouver, B. C., comprising several one-story units. Company also plans new factory branch, storage and distributing plant at Regina, Sask., and a similar service branch at St. Johns, N. B. Entire project will cost about $650,000 with equipment. New plants will be operated by Ford Motor Co. of Canada, Ltd., Windsor, Ont.

MIDDLE WEST

Kellogg Switchboard & Supply Co., 1066 West Adams Street, Chicago, manufacturer of switchboard equipment, telephones and accessories, has plans for new one-story plant, with two-story portion for administration headquarters, on Cicero Avenue, from Sixty-sixth to Sixty-seventh Streets, occupying entire block, totaling about 310,000 sq. ft. floor space. Structures on site will be razed at once and superstructure begun early in May. Cost about $1,000,000 with equipment. Fred C. Foltz, 38 South Dearborn Street, is architect.

Morris Paper Mills, Morris, Ill., has let general contract to Hansen & Petersen Co., 600 South Desplaines Avenue, Joliet, Ill., for one-story addition, 100 x 515 ft., primarily for storage and distribution. Cost over $100,000 with equipment.

Tobin Packing Co., Fort Dodge, Iowa, meat packer, has plans for branch plant at Estherville, Iowa. Cost about $185,000 with equipment. Company has organized Estherville Packing Co., a subsidiary, capitalized at $300,000, to operate new plant.

City Council, Willmar, Minn., asks bids until April 12 for extensions and improvements in municipal electric power plant, including turbo-generator unit, surface condenser and auxiliary equipment, with alternate estimates on oil engine-generating units and accessories. Burlingame, Hitchcock & Estabrook, Inc., Sexton Building, Minneapolis, is consulting engineer.

Otoe Food Products Co., Nebraska City, Neb., food packer and canner, has approved plans for one-story branch plant, 80 x 240 ft., at Scottsbluff, Neb. Cost over $50,000 with equipment. Other units will be built later.

Purchasing Officer, Department of Interior, 1749 West Pershing Road, Chicago, asks bids until April 12 for tools and equipment as required during fiscal year 1938, including post hole diggers, steel harrows, hay knives, hay forks, wire rakes, garden rakes, coal shovels, hand shovels, grain scoops, garden spades, wheelbarrows, scythes, platform trucks, dolly trucks and other equipment (Schedule 12).

Linde Air Products Co., 4251 West National Avenue, Milwaukee, has placed general contract with Arthur H. Hartman Co., local, for shop addition, 30 x 100 ft., new garage, and improvements to present shop and office building. Capacity will be enlarged 50 per cent. Armin W. Kaiser is district manager.

Crown Can Co., Philadelphia, has leased plant group of former Fuller & Johnson Co., Madison, Wis., and plans equipment installation valued at $200,000 to manufacture metal containers, principally for vegetable canning plants in Wisconsin. Harvey W. Burr, Madison, has been appointed plant manager in charge of production and distribution.

Madison-Kipp Corp., Madison, Wis., manufacturer of mechanical lubricating systems for machine tools, etc., die-casting machines and other specialties, will transfer production operations May 1 to former Four Lakes Ordnance Corp., acquired recently to increase capacity 50 per cent. Present shops will be sold or leased.

Line Material Co., South Milwaukee, manufacturer of transmission line equipment, transformers, etc., is negotiating for purchase of plant at Birmingham, now occupied under lease, and plans additions to meet demands from southern trade. Proposed investment has not been disclosed.

Seaman Body Corp., Milwaukee, subsidiary of Nash Motors Co. division of Nash-Kelvinator Corp., will start work shortly on extension of steel storage building, 71 x 100 ft., including craneway, work to cost about $50,000.

PACIFIC COAST

Continental Can Co., 5601 San Leandro Street, Oakland, Cal., has let general contract to Austin Co. of California, Inc., for one-story addition. Cost close to $60,000 with equipment. Company headquarters are in New York.

Rite Hardware Co., 1642 North Spring Street, Los Angeles, has let general contract to Frank Rasche, 2027 North Hobart Boulevard, for new one-story plant, 90 x 100 ft. Cost about $40,000 with equipment. William D. Coffey, Transamerica Building, is engineer.

Constructing Quartermaster, Sacramento Air Depot, Sacramento, Cal., asks bids until April 20 for one forming machine, one beading and crimping machine, turning and wiring machine, folder and brake, one squaring shears, drill, grinder, borer, surfacer, jointer, lathe, shaper, portable pipe machine, cornice brake, two bench-type vises and other tools (Proposal 6870-20).

Quartermaster, Ninth Corps Area, Presidio, San Francisco, asks bids until April 12 for fabrication of one unit of 16 portable demountable steel buildings and five units each of six portable demountable steel buildings for CCC camps in Ninth Corps Area.

California Packing Corp., 101 California Street, San Francisco, food packer and canner, has let general contract to H. W. Robertson, 3004 F Street, Sacramento, Cal., for new one-story packing and canning plant at Rio Vista, Cal. Cost over $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 13 for admiralty metal evaporator tubing (Schedule 324) for Puget Sound Navy Yard; until April 16, one horizontal bending press (Schedule 325) for Mare Island yard; parts for airplanes (Schedule 900-715); until April 23, parts for airplanes (Schedule 900-731) for San Diego Naval Air Station.

Hydraulic Supply Mfg. Co., 7500 Eighth Avenue South, Seattle, manufacturer of fabricated steel products, has plans for one-story addition. Cost close to $40,000 with equipment.

FOREIGN

Public and Municipal Works Division, Ministry of Interior, Government of Siam, Bangkok, Siam, has plans for new steam-electric generating plant, using diesel engine-generator units. Cost close to $1,000,000. Equipment purchases are scheduled to made soon.

Air Ministry, Government of England, London, has approved plans for immediate construction of new airplane plant on about 100-acre tract recently acquired at Speke, Liverpool, comprising group of one-story units for parts production and assembling. Equipment will be installed for ultimate employment of about 4000 persons. Completion is scheduled in fall. Cost about $2,500,000 with machinery. Plant site adjoins Liverpool municipal airport, and Mersey Docks and Harbor Board, Liverpool, plans seaplane base in connection with Government project noted, for which a three-mile site on Mersey River has been tentatively selected. It will include hangars, repair and reconditioning shops and other structures. Cost close to $400,000 with equipment.